VOL. XXX NEW YORK, THURSDAY, JANUARY 22, 1914—CHICAGO No. 4

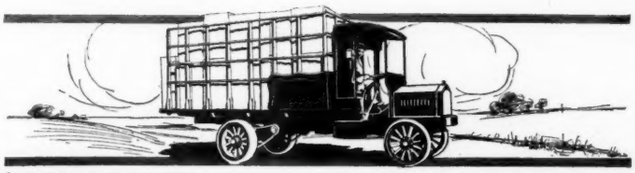
The AUTOMOBILE

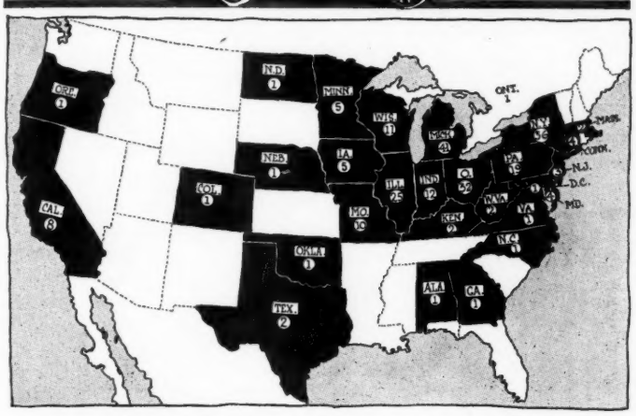
MOTOR TRUCKS REVIEWED

The Gasoline Motor Truck for 1914

85,000 Commercial Vehicles Now in Use in United States Estimated Production During 1913 Is 4,000—America Has 274 Makers—All-Around Increase in Business Registered

THE motor truck roster shows 274 concerns engaged in the manufacture of gasoline trucks in America. These concerns vary, some producing not more than three trucks per year and others approaching the 2,500 mark during the past season. Of these 274 concerns, sixty produce 90 per cent. of the trucks manufactured, and the remaining 200 are small producers, who average little more than fifteen to twenty trucks per season.





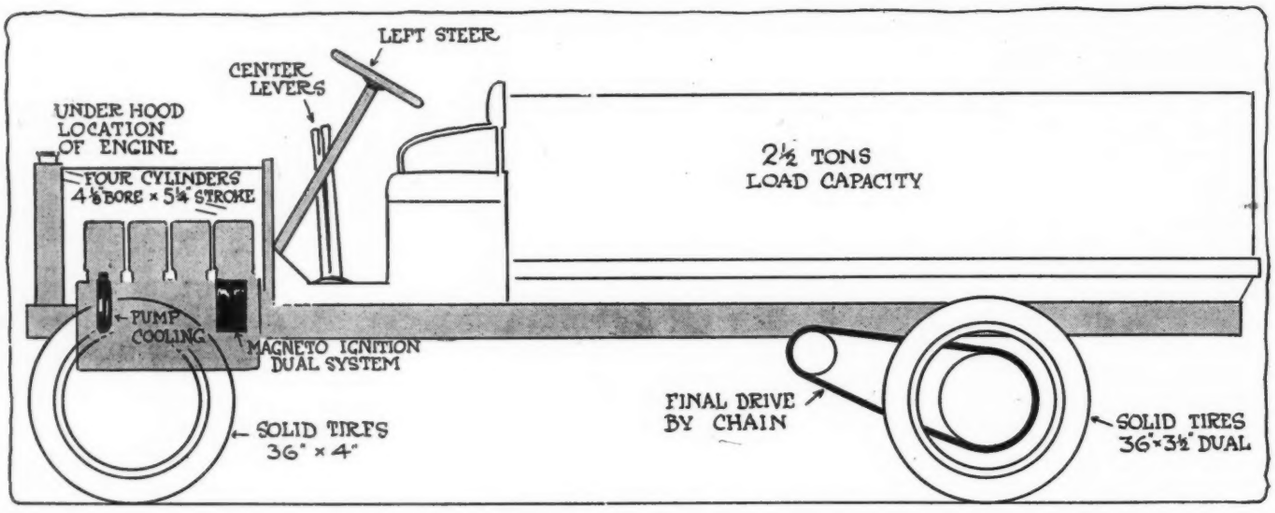
Gasoline trucks are now manufactured in twenty-nine states as indicated above. The figures show the number of makers in each of the producing states

These 274 motor truck makers are conservatively estimated to have manufactured 40,000 trucks in the 1913 season. At the opening of the year it was concluded that approximately 50,000 gasoline trucks would be manufactured in 1913, but this figure has not been attained. Some concerns have not been able to manufacture up to expectations, others have found it necessary to reduce the number manufactured during the year, and still others have been restricted in their manufacturing operations by lack of capital or lack of demand.

85,000 Gasoline Trucks in Use

The total number of motor trucks at present in America in the gasoline field ranges somewhere between 85,000 and 90,000. Definite figures are impossible to obtain, due to many companies refusing to give any figures on their production. From the best records obtainable, the total number of gasoline trucks in use today approximates 85,000 in round numbers. This total is made up of four units. Previous to and including 1910 records show 10,374 gasoline trucks; the output for 1911 was 8,500; the output for 1912 was 27,900; and the estimate for 1913 is 40,000. These figures are conservative, and when contrasted with official figures given out by the different states in the Union come considerably under their total. Some would place the total number of gasoline trucks at present in use at 100,000, but this estimate is too high.

Nineteen-thirteen must be considered as an average year in the truck field, notwithstanding the fact that the last 6 months saw many retrenchments by industrial concerns that had been looked upon as certain consumers of large quantities of trucks. In spite of these retrenchments a canvass made by THE AUTOMOBILE of sixty important truck manufacturing companies show that healthy gains in output over 1912 have been experienced, these gains averaging anywhere from 12 per cent. to 600 per cent. These figures are from the most representative truck builders, the majority of them being in the first seventy-five concerns in the industry. One company building an extensive line of six models covering a wide range of load-carrying capacity has had a 30 per cent. business increase as compared with 1912. Another concern specializing on one truck model and manufacturing it in quantities above 1,000 reports a 70 per cent. increase in business over 1912. A Pacific Coast manufacturer reports 100 per cent. increase. A Michigan concern in the truck industry for years, and noted for business conservatism, reports 25 per cent. increase. Another Michigan house



Diagrammatic outline of the 1914 composite gasoline truck illustrating features averaged from a review of the manufacturing field

building trucks under 1-ton capacity in large capacities, reports 50 per cent. increase over the preceding year. These figures do not convey a pessimistic story, although it cannot be denied that other concerns showing a decreasing business in the last 6 months could be cited.

Business Has Increased

The following figures, based on the reports furnished by many different manufacturers from different states, show the increase in business in 1914 as compared with 1913:

California	100 per cent.	Pennsylvania	126 per cent.
Ohio	400 per cent.	Pennsylvania	66 per cent.
Ohio	30 per cent.	Pennsylvania	200 per cent.
Ohio	12 per cent.	New York	300 per cent.
Wisconsin	600 per cent.	New York	30 per cent.
Wisconsin	30 per cent.	Massachusetts	150 per cent.
Wisconsin	350 per cent.	North Carolina	100 per cent.
Michigan	50 per cent.	Illinois	50 per cent.
Michigan	70 per cent.	Texas	150 per cent.
Michigan	25 per cent.	Indiana	Slight
Michigan	100 per cent.	Michigan	Very material
Michigan	75 per cent.	Ohio	Very material

Each figure applies to a particular company and must not be taken as representative of the entire state. It is noteworthy that in this list there is not a single example showing a decrease in the amount of business done as compared with 1912. In this connection it is only correct to state that half a dozen concerns, that have been doing a largely increased business during the past year, have refused to give figures on the amount of increase, but in every case mention that an increase has taken place.

Consumers' Roll of Merit

The larger cities still continue as the great users of motor trucks. In reports from approximately 100 truck manufacturers as to the ten cities which have been the greatest consumers of their trucks during 1913, the following forty cities in the order mentioned have been the largest buyers:

New York	St. Louis	Washington	San Antonio
Chicago	Portland, Ore.	Salt Lake City	Omaha
Boston	Milwaukee	New Orleans	Tacoma
San Francisco	Seattle	Youngstown	Jacksonville
Los Angeles	Toledo	St. Paul	Savannah
Buffalo	Cincinnati	Newark	Ft. Worth
Pittsburgh	Indianapolis	Springfield, Mass.	Akron
Philadelphia	Rochester	Baltimore	Erie
Cleveland	Minneapolis	Duluth	
Kansas City	Detroit	Denver	

California Takes Its Position

The names of several of the smaller-population cities included herewith suggests the growth in the use of motor delivery wagons with capacity of 1,000 pounds, and over. One of the surprises of the year has been the increase in California, the manufacturers of motor trucks on the coast reporting a heavy business increase, particularly in San Francisco and Los Angeles. This is largely due to the enormous suburban area surrounding these cities, which has made it imperative that merchants employ motor deliveries in order to make prompt deliveries of household goods.

An analysis of what industries have been the largest users of motor trucks during the past season shows that general trucking has increased very materially. Every motor truck concern reporting on the ten industries, which were the largest buyers during 1912, has included this division of general trucking.

Next to that of general trucking is the field of contractors and building construction work. This is followed closely by the wholesale and retail grocery trade, with which can be coupled commission firms dealing in fruits and produce. If we were to add to the grocery business the creamery field, the fruit and produce line, we would have a total in excess of the demand in the general trucking field. It is questionable if the greatest demand has not been in the grocery and produce field, as our returns fail to show the widely scattered work in this field by many truck-building companies, who are local in character and do not endeavor to carry on a business extending beyond a radius of 150 miles from their factories.

The other industries which have been heavy purchasers of trucks during the last year are breweries and liquor dealers, coal and ice companies, oil concerns, and public utilities, with which can be linked vehicles purchased for municipal use. The year just closed has shown an increased use in motor delivery in the dry goods field, particularly in small cities. There has been a quite general increase in the furniture field. Sales to the meat-packing industry have not been as high as anticipated. The coal industry has not been the big consumer that it was in 1912.

Buyers in Small-Load Fields

When the consumers of light delivery wagons of 1,000 pounds capacity are analyzed, it is found that laundries, florists, bakers, hardware concerns, plumbing houses, and milk companies have been large purchasers. A careful analysis, not only of the cities that have been the greatest buyers, but also the industries which have made heavy purchases shows that it is becoming imperative to purchase trucks, particularly where they are used for delivery in cities with a large suburban population.

While the above mentioned industries have been the largest buyers of trucks during the past year, a vote shows that there has been a general increase in the sales to certain industries over preceding years, whereas in others there has been little increase. Those industries which show increased purchasing power during 1913, are general trucking, contractors, brewers, groceries, oil concerns, municipal companies, and department stores. Few, if any truck makers have reported increased business from such

fields as, meat-packing, farmers, furniture, express, public utilities, etc.

What of 1914?

That the trend of buying changes from year to year is proven by the fact that many companies anticipate other industries to be larger buyers in 1914 than in 1913. One maker looks to municipalities, iron and steel, dry goods, wholesale grocers, and lumber dealers to be the big buyers this year; another selects grain companies, public service corporations, furniture, and hardware concerns; a fourth selects breweries, furniture dealers, oil companies, and express companies; a fifth manufacturing a light delivery vehicle, looks to laundries, groceries, florists, and bottling concerns, and a sixth in the same field makes practically the same selection.

306 Models to Select From

Although the present roster of the motor truck industry shows 274 names THE AUTOMOBILE is only able to give specifications of the chassis parts of 138 of these makers, approximately one-half, the remainder not being prepared to give the necessary information. These 138 concerns list 306 different models. These figures show a slight reduction as compared with 1912, when our specifications included 163 different makers, listing 429 models. In a word, this reduction in numbers suggests a considerable reduction in the number of truck models built for 1914 by several concerns as compared with 1913. A comparison of the specifications of this year, as compared with those of last year shows the evolving of definite policies on the part of many manufacturers; thus some concerns, which a year ago endeavored to cover too wide a field, have reduced some models and are focusing on motor delivery between 1 and 2 tons. There are others who have actually added to the number of their models in order to more fully cover the restricted field they have selected. A few examples will show this tendency towards concentration on one field of delivery, whether it covers load capacities under 1-ton, from 1 to 2 tons, or from 2 to 10 tons. Last year the Adams company had one model rated at 1.5 ton, and this year it has three models rated 1, 1.5, and 2-ton. This would seem to be an example of concentrating on the field between 1 and 2 tons and endeavoring to cover it in the most thorough manner.

Extending the Selling Field

There are many concerns that have widened their field of selling during the past year, some of these in 1912, and part of 1913, marketing but a single model but now having more. The Pierce-Arrow is an example of this class, having added during the past year a 2-ton truck to its previous 5-ton model. Dorris, previously building a 3-4-ton has recently added a 2-ton chassis. Packard which began 1913 with three models, 2, 3, and 5-tons added two others, namely 4 and 6-tonners during the past year, so that now its line progresses in 1-ton increases from 2 to 6-ton capacities.

Lippard-Stewart has added to its 3-4-ton truck a larger one of 1 1-2-ton size. Sternberg a year ago listed four models, 2, 3, 4, and 6-ton sizes, and has added three others namely 2 1-2, 5, and 7-ton models, so that he covers the field from 2 to 7 tons.

Menominee a year ago built two models, 3-4 and 1 tonners and has now added to these a 1 1-2-ton size. During the year Sanford has added a 1 1-2-ton size to its previous 1-ton model. Modern has added a 1 1-2-ton model. This program of additions could be continued in a score or more places.

Following Settled Policies

While several concerns have found it advisable during the year to increase the number of models as outlined, others have found that their previous line satisfactorily covered the field. Thus White, continues this year its 1913 program carrying four models, namely 3-4, 1.5, 3 and 5-ton sizes. Peerless continues its four models, namely 3, 4, 5, and 6-ton sizes. Kissel continues with its six models which cover a slightly increased field as compared with last year. In 1913 capacities were 3-4, 1, 2, 3, 4, and 5-ton sizes; for this year, the revised rated capacities are, 3-4, 1, 1.5, 2.5, 3.5, and 6-ton sizes respectively.

Autocar continues with one model, namely 1.5 ton. Federal another large producer, builds but one size. The G.M.C. line remains as in 1913, namely 1 1-4, 2, 3 1-2, and 5-ton sizes. Speedwell continues with three models, 2, 4, and 6-ton. Atterbury continues its five models of last year covering the field between 3-4 and 5-ton. Lauth-Jeurgens continues its 1913 policy. Velie has slightly reduced its ratings which last year were 2 1-2 and 3 1-2-tons and for this season are 2 and 3 tons.

Have Changed Their Plans

Space will not permit to go further into this analysis of the truck field, except in one or two cases. Studebaker, which a year ago, brought out two new truck models of 1 1-4 and 4-ton capacities, has discontinued them and is centering on a 3-4-ton delivery wagon. Locomobile continues with its one 5-ton model. Stegeman has dropped its 6-ton size continuing its five other models.

One-Third Has Changed

An analysis of the entire truck industry shows that the roster of this year contains ninety-four names different from that of a year ago. This difference is made up of approximately sixty names which have been dropped during the year due to one cause or another and to the addition of about thirty new names

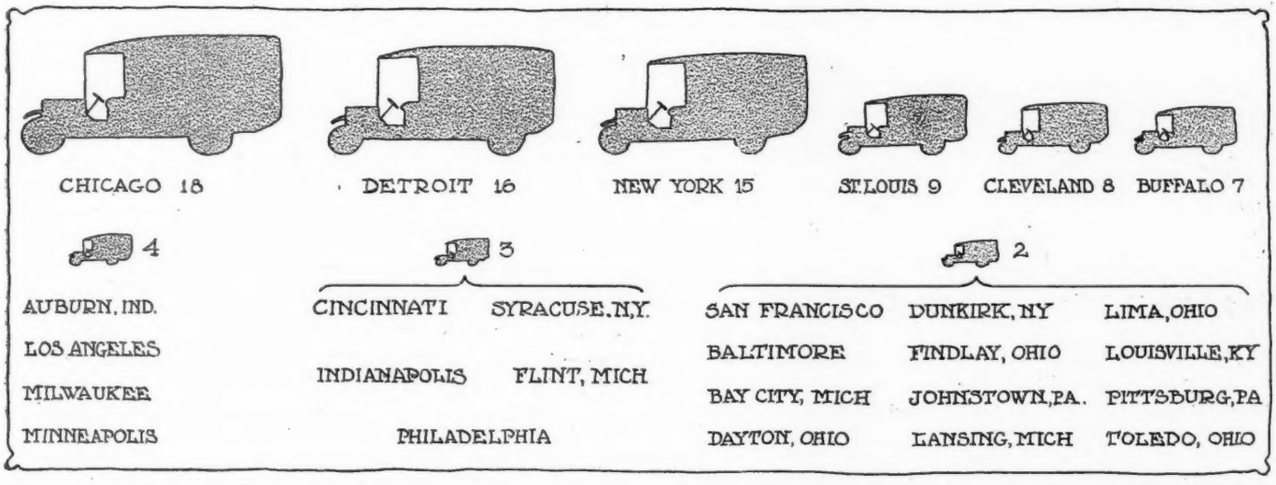
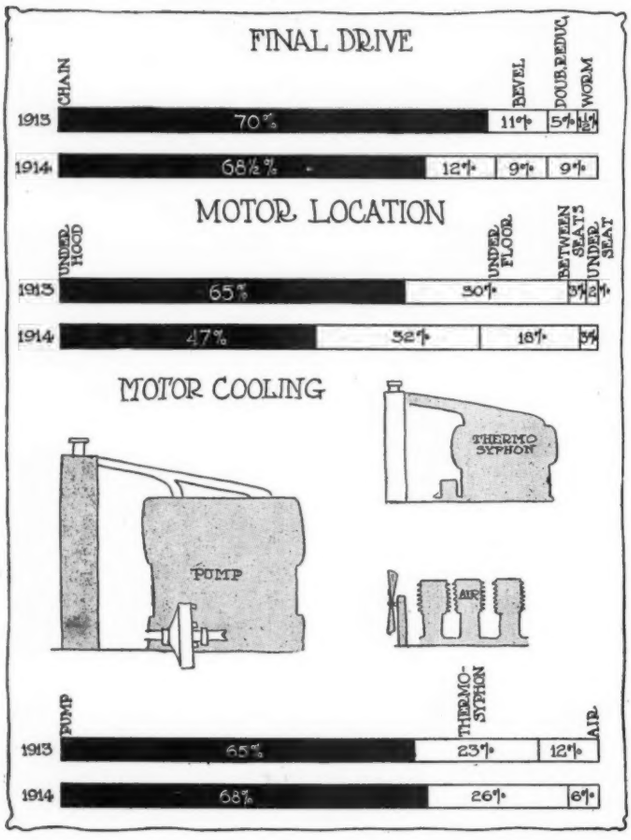


Chart showing the distribution of truck makers according to cities. Chicago, Detroit and New York City are the leaders in the order named. Twelve cities have two makers each



Showing the changes that have taken place in the percentage of final drive types, location of the engine and methods of engine cooling

A change of ninety names in a roster of 270 in a year, which is one-third of 33 per cent., looks as if an earthquake had struck the motor truck industry, but this is not the case. Several names are dropped from the roster due to their deciding to abandon the truck industry. An example of this is the Alco concern, which during the year entirely withdrew from the truck field. Another example is the Ford company which has discontinued its delivery car. A dozen other names which have disappeared are those of passenger car concerns which have manufactured a few semi-trucks or delivery wagons. enough to entitle them to a motor truck classification, and who during the year have gone through receivership and discontinued business. Other names dropped from the roster include those that have been reorganized during the year under different names and appear in the industry as new concerns.

Of the thirty new names on the motor truck roster, only two are those of passenger car building companies that have attained national prominence. This would tend to show that the policy of concerns specializing on passenger cars taking up the truck industry is at a lower ebb today than ever before. The Moon company has announced its entry into the truck field; the Case company has recently joined the commercial ranks, and a short time ago Merchant & Evans, made their début.

Worm Drive Winning

Worm-drive has made considerable progress during the past year, and there are now 13 concerns listed as manufacturing this form of final transmission. Pierce-Arrow the pioneer in this field continues it on its 2 and 5-ton trucks, and is practically the only concern using worm-drive on a 5-ton model. Other users of worm drive are Smith, Sternberg, Blair, Atterbury, Crown, Lippard-Stewart, Diamond-T, Moreland, Universal, Maccar, Schacht, and Trabold.

Although the gains during the year made by worm drive are not as spectacular as anticipated, it cannot be denied that the enclosed drive as compared with chain drive has made very pronounced gain during the year. An analysis of the specification table shows that there are thirty-eight makers of some form of enclosed bevel drive. Add to this the fourteen makers of worm drive and there is a total of fifty-two manufacturers out of 138 listed, using internal drive.

The majority using bevel-driven axles are low-capacity vehicles, there being but four in the 3,000-pound field and the majority in the 1,500-pound class. This shows that side-chain still has a big following in trucks with capacity of 3 tons and upwards.

There are nineteen makers who use mixed drive, that is, using gear or worm on some of their models, and chain on others. This list includes such names as White, Willet, Universal, Trabold, Sternberg, Stegeman, Rockford, Moreland, Moon, Lippard-Stewart, Krebs, Kissel, Jeffery, Dorris, Diamond-T, Best, Atterbury, Armleder, and Auglaize. It is customary with these concerns to use bevel drive on their models up to 1 ton and chain on their larger types. Thus White uses bevel drive on its 1,500, and 3,000-pound models, and chain on its 3 and 5-ton sizes. Kissel uses bevel on 3-4 and 1-ton, and chain on all above. Dorris uses bevel on its 1,500 and chain on the 2-tonner.

Buying Is Imperative

It no longer seems necessary to prove to the prospect that motor truck equipment will effect a saving in his delivery, yet there are times when this argument again recurs and the sales forces of all makers are now pretty well fortified with telling figures based on actual tests which prove the point in almost any line of transportation. This is simply another instance of the scientific and businesslike basis to which the marketing of trucks has attained.

But the great increase of the motor truck in many lines of delivery is not only chargeable to enterprising methods of selling, but also to the great growth of the passenger vehicle industry as well. The motor car has made it possible for thousands of city people to get out of the congested districts and into the suburbs of the big centers. Sometimes they go out 25 or 30 miles where they can have all the advantages and openness of the country. They rely upon their motor cars to quickly bridge the distance between business and home. And the merchant must of necessity have motor delivery vehicles to cover these outlying districts. He can make his deliveries in no other way.

Prices on Lower Levels

Although makers are offering more truck for the money, the average price of a truck of nearly any given capacity is less than last year. Averaging in all of the prices, the difference is $27 over the 1913 composite figure.

In the 1-2-ton class, for instance, the average cost for 1913 was $1,527.77, while for the current year it is $1,002.00, or a reduction of $525.77.

In the 7-ton field, the average price of 1913 was $5,600, while the 1914 catalogs afford data for an average $1,180 less. These are eloquent figures.

As an impetus to motor truck selling, it is to be deplored that there are no national motor truck shows this year. They are a great factor in the educating of the general public in the great strides which these vehicles have made and even if the maker cannot directly trace a great many sales to them, they are of great value to all. A motor truck show is just as much of a great composite catalog of the industry for the year as is the passenger vehicle exhibition and is just as logical. Before the prospective buyer is arrayed a multitude of models and types, giving him a better opportunity for quick comparison and estimate of what he can get than would several weeks of earnest visitation of salesrooms.

Mechanically, motor trucks have had a logical and conservative development within the year. The trend has all been along the lines of greater efficiency, better materials, greater accessibility and a general smoothing out of rough points of design.

As in the passenger car field, left drive and center control have come into their own with surprising rapidity. There was a marked following for the right steer during the past year, but now the pendulum has swung to the other side. Fifty-one per cent. of the models are steered from the left. It will take time to determine whether or not this is to be preferred to placing the driver on the right, and if it is, public demand will draw all makers into the fold.

Left drive may be said to be logical from nearly all standpoints. The left is the side nearest traffic, and at the same time it is a safety factor to be able to look out to determine whether another vehicle is too close to make a turn possible. Then, too, center control usually goes hand in hand with left drive and this brings the brake rods and shifting rods in straighter and more direct line with the gearbox and the brakes. It also is much handier, since there is not the danger of entanglement with the storm curtains at the side.

The War of the Motors

Although the location of the motor is still as much of a bone of contention as it ever was, there is a greater number of truck users in favor of the locating of the engine under the floor than a year ago. In 1913 there were 65 per cent. of the makers listing their models with motors forward under a hood, while the list this year shows that this percentage has dropped back to 55 per cent. under-the-floor construction taking a jump from 30 to 35 per cent., between-the-seat positions having an increased following of from 3 to 18 per cent. and under-the-seat locations advancing from 2 to 3 per cent.

Pros and Cons of Motor Location

For the forward hood placing of the motor has always been argued that it has greater accessibility, makes simpler control connections, gives easier access to the seats and presents a better appearance, while at the same time shifting the load back so that the greater percentage of it is on the driving wheels.

As against this are set down the arguments that other positions of the engine make possible a shorter overall length of the vehicle, more even distribution of weight on the two sets of wheels and axles, positioning the driver higher up so that he is afforded a more advantageous view of traffic, and by reason of the shorter length taking up less room in storage.

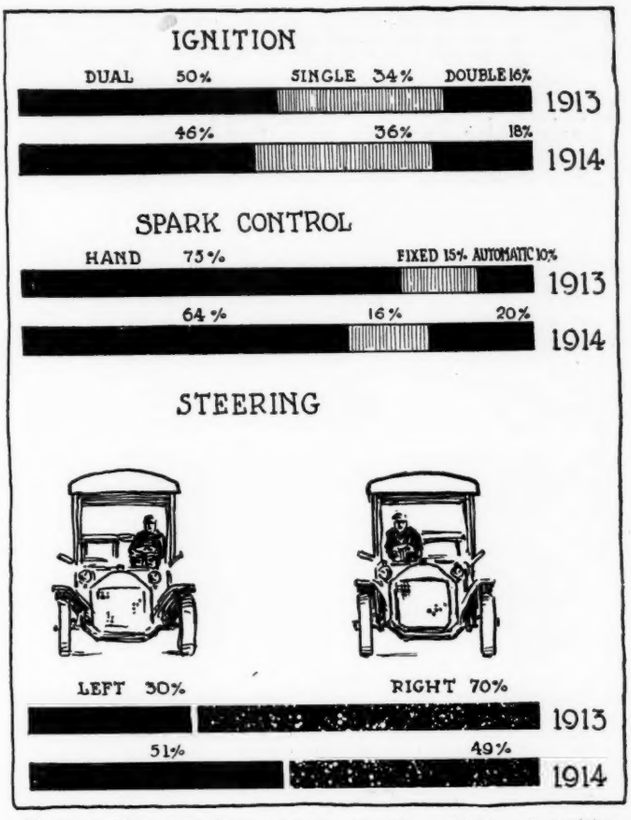
The matter of load distribution is the most serious of all, and it has long been argued pro and con whether or not the heavier rear construction necessary with the forward hood types due to the rear having to take a greater proportion of the load is counteracted and outweighed by the fact that by so proportioning the load better traction is obtained.

The compromise construction of placing the motor under a hood and between the seats goes a long way towards meeting the views of both factions, for it allows a shorter wheelbase, places the driver higher and at the same time there is not so much of the load carried on the rear wheels, the vehicle so made being somewhat shorter than the motor-under-the-hood type and longer than the under-floor variety. Its growing popularity is evidenced by the greater favor in which it is now held by makers.

Crowning the Governor

Governors are now almost universally used. They are regarded as one of the greatest safeguards to excessive speed, which in itself is the one greatest enemy to truck life. Most makers now enclose all parts of the governor mechanism and seal them against any tampering by the driver, so that it is almost impossible for him to change its setting or disconnect it without certain detection. Of course, if the driver wishes to disconnect the governor, he can do so but that is up to the truck owner, who knows what the consequences of excessive speeds are.

At any rate, when the spirit of them is carried out, they do actually work to advantage in service. But there is still much room for improvement in them. Sensitive governors do not work satisfactorily on rough roads, while less sensitive ones do not act quickly enough. There is also the question as to the advisability of governors in hilly districts where some speeding up is at times necessary. When operated in these districts a free engine seems very desirable, although the car speed ought to be governed.



Showing the percentage changes in the methods of ignition, spark control and steering. The left steering position predominates for 1914

Lower Load Platforms Needed

Makers have realized that it is advantageous to have the load platform as low as possible, and a marked tendency in this direction has made itself manifest in the past year. Both truck makers and builders of bodies have co-operated in this, the former by using flatter springs and underslinging them from the axles and designing the frames for reduced spring play and the latter by the use of bodies with lower beds. These, instead of being supported by ribs or bolsters, rest directly upon the frames, and cut off several inches of height. Often the wheels extend into the body, being covered, of course.

Views on Frame Designs

Pressed steel frame construction predominates, although several leading makers employ rolled steel and I-beam designs most satisfactorily. Pressed steel is light, strong and makes for easy mounting of brackets, has smooth rivet surface and looks neat. The claim is often made that pressed steel makes a better manufacturing proposition than do I-beam-built-up types and that they are stronger. In manufacturing, however, the pressed steel frame admits of much less flexibility of frame length. The pressed steel frame lengths must be ordered of specified length, and where a maker furnishes almost any desired frame length to his buyers, it means a greater stock of sizes. But with the rolled sections, which can be obtained of almost any steel mill, these can be stocked in the longer lengths and later cut off to meet requirements. Then the cut off pieces often serve for other purposes of construction, so that from, the manufacturing standpoint, the rolled sections have an advantage, while at the same time they give satisfactory service.

Along with other points of simplification of the motor truck is

(*Continued on page 275.*)

Directory of Gasoline Truck Makers

Giving the Names and Addresses of the Various Companies, the Name of the Truck Manufactured and the Number of Models of Each Load Capacity from 500 to 14,000 Pounds Included in the Line of Each Maker

NAME OF COMPANY	ADDRESS	NAME OF TRUCK	CAPACITIES																
			500	800	1000	1100	1200	1500	2000	2500	3000	4000	5000	6000	7000	8000	9000	10,000	12,000	14,000
Available Truck Co	Chicago, Ill	Available							1											
Armleder Co., O	Cincinnati, O	Armleder							1			1	1	1						
Auglaize Motor Car Co	New Bremen, O	Auglaize						2	1											
American Ice Mfg. Co	New York City	A.I.C																1		
American Motor Car Co	St. Louis, Mich	Admiral									1									
Atterbury Motor Car Co	Buffalo, N. Y	Atterbury						1	1			1		1				1		
Adams Bros. Co	Findlay, O	Adams							1		1	1								
Avery Company	Peoria, Ill	Avery							1			2		2				1		
Autocar Company	Ardmore, Pa	Ardmore									1									
American Motor Truck Co	Detroit, Mich	American							1											
Abendroth & Root Mfg. Co	Newburgh, N. Y	A. & R												1		1		1		
Auburn Motor Chassis Co	Auburn, Ind	Auburn	2																	
Akron Motor Car & Truck Co	Akron, O	Akron																		
Buick Motor Co	Flint, Mich	Buick			1			1												
Blair Mfg. Co	Newark, O	Blair									1	1			1			1		
Durant-Dort Carriage Co	Flint, Mich	Best			1															
C. L. Barker	Norwalk, Conn	Barker							1											
Bauer Machine Works Co	Kansas City, Mo	Bauer			1			1												
Bessemer Motor Truck Co	Grove City, Pa	Bessemer							1		1									
Brown Commercial Car Co	Peru, Ind	Brown						1												
Buckeye Mfg. Co	Anderson, Ind	Lambert	1					1			1	1								
Huselton Motor Co	Butler, Pa	Butler						1												
Cedar Rapids Auto Works	Cedar Rapids, Ia	Beck			1				1			1		1						
Brockway Motor T. Co	Cortland, N. Y	Brockway						1	2		1									
Gramm Bernstein Motor T. Co	Lima, O	B. A. Gramm							1			1			1			1		
Baker & Bell Motor Truck Co	Philadelphia, Pa	Baker																		
Best Mfg. Co	San Leandro, Cal	Best			1				1											
B. F. Board Motor Truck Co	Alexandria, Va	Board																		
Brooks Latta Automobile Co	St. Louis, Mo	Brooks																		
H. E. Bucklen, Jr., M. T. Co	Elkhart, Ind	Bucklen						1			1		1							
Buffalo Auto Truck Co	Buffalo, N. Y	Buffalo																		
Beaver State Motor Truck Co	Gresham, Ore	Beaver																		
Brodesser Motor Truck Co	Juneau, Wis	Brodesser																		
Couple-Gear Freight Wheel Co	Grand Rapids, Mich	Couple-Gear													1				1	
Corbitt Automobile Co	Henderson, N. C	Corbitt							1											
Crown Commercial Car Co	N. Milwaukee, Wis	Crown							1			1								
Coleman Carr'ge & Harness Co	Ilion, N. Y	Coleman							1			1								
Chase Motor Truck Co	Syracuse, N. Y	Chase			1				1		1	1								
Commerce Motor Car Co	Detroit, Mich	Commerce			1															
Clark Delivery Car Co	Chicago, Ill	Clark			1															
E. C. Clark Motor Co	Jackson, Mich	Cleveland						1												
Carrol Motor Car Co	Strassburg, Pa	Carrol																		
Cleburne Motor Mfg. Car Co	Cleburne, Tex	Luck Utility			1															
Chautauqua Motor Co	Dunkirk, N. Y	Caldwell																		
Continental Truck Mfg. Co	Superior, Wis	Continental							1		1									
Cooper Machine Works	Brooklyn, N. Y	Cooper																		
Crawford Automobile Co	Hagerstown, Md	Crawford						1												
Crescent Motor Co	Middletown, O	Crescent																		
Croce Auto Co	Asbury Park, N. J	Croce						1												
Croxton Motor Car Co	Washington, Pa	Croxton (Taxic's)																		
Front Drive Motor Co	Hoboken, N. J	Christie																		
Pittsburg Machine Tool Co	Pittsburgh, Pa	Curtis									1		1							
Danielson Eng. Works	Chicago, Ill	Danielson			1															
Dart Mfg. Co	Waterloo, Ia	Dart	1						1			1								
Dain Mfg. Co	Ottumwa, Ia	Dain							1											
Dayton Auto Truck Co	Dayton, O	Dayton						1	1			1		1		1		1	1	1
DeKalb Wagon Works	DeKalb, Ill	DeKalb										1								
Devon Tractor	Philadelphia, Pa	Devon Tractor														1				
Diamond-T Motor Co	Chicago, Ill	Diamond-T			1									1				1		
Dispatch Motor Car Co	Minneapolis, Minn	Dispatch			1															
Dorris Motor Car Co	St. Louis, Mo	Dorris						1				1		1						
Duryea Motor Co	Saginaw, Mich	Duryea	1		1															
Duplex Power Car Co	Charlotte, Mich	Duplex										1								
Durocar Mfg. Co	Los Angeles, Cal	Durocar			1															
Duffy Bros. Motor Truck Co	San Francisco, Cal	Duffy																		
Elk Motor Truck Co	Charleston, W. Va	Elk									1			1				1		
Neustaedt Motor Car Co	St. Louis, Mo	Neustaedt																		
Epperson Commercial Truck Co	St. Louis, Mo	Epperson																		
Evans Motor Car Co	Travers City, Mich	Evans																		
Ewing Motor Truck Co	Findlay, O	Ewing																		
Fargo Motor Car Co	Chicago, Ill	Fargo						1												
Federal Motor Truck Co	Detroit, Mich	Federal			1															
Four Wheel Drive Auto Co	Clintonville, Wis	Four Wheel Drive			1									1						
Durant-Dort Carriage Co	Flint, Mich	Flint						1												
Faurick Motor Car Co	Sioux Falls, S. D	Faurick			1			1	1			1								
Gabriel Auto Co	Cleveland, O	Gabriel																		
Garford Motor Car Co	Elyria, O	Garford										1		2				1	1	
S. G. Gay Co	Ottawa, Ill	Gay						1	1											
Geneva Wagon Co	Geneva, N. Y	Geneva			2															
General Motors Truck Co	Pontiac, Mich	G M C							1			1			2			2		
Gramm Motor Truck Co	Walkerville, Ont	Gramm							1			1			1					
G. A. Schacht Motor Truck Co	Cincinnati, O	G. A. Schacht										1								
Gaylord Motor Car Co	Gaylord, Mich	Gaylord																		
Great Southern Auto Co	Birmingham, Ala	Great Southern																		
General Vehicle Co	Long Island City	G V Mercedes																		
Golden West Motors Co	Sacramento, Cal	Golden West												1						
Harvey Motor Truck Works	Harvey, Ill	Harvey							1											
Detroit-Wyandotte Motor Co	Wyandotte, Mich	Horner							1		1	1		1						
Hupp Motor Car Co	Detroit, Mich	Hupmobile	1																	
Harder Auto Truck Co	Chicago, Ill	Harder																		
Hatfield Auto Truck Co	New York City	Hatfield																		
Roland Gas-Electric Vehicle Co	New York City	Hexter									1									
Ideal Automobile Co	Fort Wayne, Ind	Ideal							1		1		1	1						
International Harvester Co	Chicago, Ill	I H C			2															
Harwood-Barley Mfg. Co	Marion, Ind	Indiana							1											

Directory of Gasoline Truck Makers

NAME OF COMPANY	ADDRESS	NAME OF TRUCK	CAPACITIES																	
			500	800	1000	1100	1200	1500	2000	2500	3000	4000	5000	6000	7000	8000	9000	10,000	12,000	14,000
Internal Gear Drive Co	Detroit, Mich	Internal G'r Drive																		
W. H. McIntyre Co	Auburn, Ind	Imp	1																	
Thos. B. Jeffery Co	Kenosha, Wis	Jeffery						1	1		1									
Jarvis B Huntington Auto Co	Huntington, W. Va	Jarvis										1		1				1		
Juno Motor Truck Co	Juneau, Wis	Juno																		
Johnston Motor Car Co	Johnston, Pa	Johnston																		
Kissel Motor Car Co	Hartford, Wis	Kissel Kar						1	1		1		1		1				1	
Kalamazoo Motor Vehicle Co	Kalamazoo, Mich	Kalamazoo									1									
Kosmath Company	Detroit, Mich	Kosmath			1															
Knickerbocker M. T. Co	New York City	Knickerbocker											1			1		1		
H. J. Koehler S. G. Co	New York City	Koehler							1											
Krebs Commercial Car Co	Clyde, O	Krebs			1			1	1		1									
Kearns Motor Truck Co	Beavertown, Pa	Kearns					1													
Kelly Springfield M. T. Co	Springfield, O	Kelly							1			1		1				1		
A. R. King Mfg. Co	Kingston, N. Y	King													1					
Knox Auto Co Also 10 and 20-ton tractors.	Springfield, Mass	Knox										1		1						
Kopp Motor Truck Co	Buffalo, N. Y	Kopp									1			1				1		
Krickworth Motor Truck Co	Chicago, Ill	Krickworth																		
Kleiber Company	San Francisco, Cal	Kleiber																		
Amer. La France Fire Eng. Co.	New York City	La France																1	1	
Wm. Landshaft & Sons	Chicago, Ill	Landshaft						1			1									
Lange Motor Truck Co	Pittsburg, Pa	Lange							1		1	1								
Lewis Motor Truck Co	San Francisco, Cal	Lewis											1	1				1		
Lauth Juergens M. C. Co	Buffalo, N. Y	Lippard Stewart						1			1									
Light Commercial Car Co	New York City	Light	2																	
Chicago Pneumatic Tool Co	Chicago, Ill	Little Giant							2											
Locomobile Co	Bridgeport, Conn	Locomobile																1		
Longest Brothe6s Co	Louisville, Ky	Longest												1						
Lord Baltimore M. T. Co	Baltimore, Md	Lord Baltimore							1			1								
Lauth Juergens M. C. Co	Fremont, O	Lauth Juergens							1			1		1				1		
Lincoln Motor Car Works	Chicago, Ill	Lincoln	1																	
La Crosse Motor Truck Co	La Crosse, Wis	La Crosse																		
International Motor Co	New York City	Mack							1									1		1
Maccar Co	Scranton, Pa	Maccar						1	1		1	1								
Mais Motor Truck Co	Indianapolis, Ind	Mais									1	1	1	1						
Nordyke & Marmon Mfg. Co	Indianapolis, Ind	Marmon						1												
Martin Carriage Works	York, Pa	Martin							1		1		1			1				
D. F. Poyer Co	Menominee, Mich	Menominee						1	1		1									
Mercury Mfg. Co	Chicago, Ill	Mercury			1															
Bowling Green Motor Car Co	Bowling Green, O	Modern						1	1		1									
Monitor Automobile Works	Janesville, Wis	Monitor			1				1											
Mora Power Wagon Co	Cleveland, O	Mora							1											
Pacific Metal Products Co	Los Angeles, Cal	Moore									1	1		1		1				
Jos. W. Moon Buggy Co	St. Louis, Mo	Moon			1						1									
Miller Car Co	Detroit, Mich	Miller			1															
Mogul Motor Truck Co	St. Louis, Mo	Mogul										2				1			2	
Moreland Motor Truck Co	Los Angeles, Cal	Moreland						1				1						1		
Morton Truck & Tractor, Inc Also 10-ton tractor.	Harrisburg, Pa	Morton										1		1				1		
Tarrytown Motor Car Co	New York City	Motokart	1																	
W. H. McIntyre Co	Auburn, Ind	McIntyre			1				1			1		1				1		
Marinette Motor Car Co	Marinette, Wis	Marinette	1																	
Merchants Auto Co	Chicago, Ill	Merchants																		
Metropolitan Automobile Co	Chicago, Ill	Metroplitan																		
Motor Vehicle Const. Co	Sewaren, N. J																			
Muelhauser Machine Co	Cleveland, O	Muelhauser																		
Maxim TriCar Co	Port Jefferson, N. Y	Maxim		1																
Moore Motor Truck Co	Philadelphia, Pa	Moore																		
Woods Mobilette Co	Chicago, Ill	Mobilette																		
National Motor Truck Co	Bay City, Mich	Natco							1											
Nelson & LeMoon	Chicago, Ill	Nelson LeMoon							1			1		1						
Nevada Mfg. Co	Nevada, Ia	Nevada												1						
Tegetmeier & Riepe Co	New York City	New York									1									
New Haven Truck & Auto Wks.	New Haven, Conn	New Haven																		
Star-Tribune Motor Sales Co	Detroit, Mich	O K			1				1											
Willys-Overland Co	Toledo, O	Overland	1																	
Ohio Mfg. Co	Upper Sandusky, O	Ohio																		
Old Reliable M. T. Co	Chicago, Ill	Old Reliable												1				1		
Owosso Motor Co	Owosso, Mich	Owosso																		
Packard Motor Car Co	Detroit, Mich	Packard										1		1		1		1	1	
Palmer Moore Co	Syracuse, N. Y	Palmer Moore						1												
Motor Car Mfg. Co	Indianapolis, Ind	Pathfinder							1											
Perfex Company	Los Angeles, Cal	Perfex			1															
Palmer-Meyer Motor Car Co	St. Louis, Mo	Palmer							1		1									
Pope Mfg. Co	Hartford, Conn	Pope Hartford												1				1		
Peerless Motor Car Co	Cleveland, O	Peerless												1		1		1	1	
Pierce Arrow Motor Car Co	Buffalo, N. Y	Pierce Arrow										1						1		
F. W. Parsons Co	Newton, Iowa	Parsons																		
Phoenix Auto Works	Phoenixville, Pa	Phoenix																		
Plymouth Motor Truck Co	Plymouth, O	Plymouth							1			1								
Reo Motor Truck Co	Lansing, Mich	Reo										1								
Rockford Motor Truck Co	Rockford, Ill	Rockford						1				1								
Alma Motor Truck Co	Alma, Mich	Republic						1												
Rogers Motor Car Co	Omaha, Nebr	Rogers																		
Rowe Motor Co	Coatesville, Pa	Rowe						1	1		1	1		1				1		
Sanford Motor Truck Co	Syracuse, N. Y	Sanford							1		1									
Selden Motor Vehicle Co	Rochester, N. Y	Selden							1											
Service Motor Car Co	Wabash, Ind	Service									1	1		1						
Signal Motor Truck Co	Detroit, Mich	Signal						1												
Shop of Siebert	Toledo, O	Siebert						1												
Speedwell Motor Car Co	Dayton, O	Speedwell							1							1			1	
Standard Motor Truck Co	Detroit, Mich	Standard												1		1				
Star Motor Car Co	Ann Arbor, Mich	Star							1		1									
F. B. Stearns Co	Cleveland, O	Stearns																1		
Stegeman Motor Car Co	Milwaukee, Wis	Stegeman						1	1			1		1		1				
Stewart Motor Corp	Buffalo, N. Y	Stewart						1												
Sternberg Mfg. Co	Milwaukee, Wis	Sternberg										1	1	1		1		1	1	1
Studebaker Corp	Detroit, Mich	Studebaker						1												
Sullivan Motor Car Co	Rochester, N. Y	Sullivan							1											
Standard Motor Truck Co	Cleveland, O	Standard							1		1									
Stanley Motor Carriage Co	Newton, Mass	Stanley						1	1											
F. G. Clark Co	Lansing, Mich	Superior																		
St. Louis Motor Truck Co	St. Louis, Mo	St. Louis																		
Sandusky Auto Parts & Mot.Co.	Sandusky, O	Sandusky							1			1								

Directory of Gasoline Truck Makers (Continued)

NAME OF COMPANY	ADDRESS	NAME OF TRUCK	CAPACITIES																
			500	800	1000	1100	1200	1500	2000	2500	3000	4000	5000	6000	7000	8000	9000	10,000	12,000	14,000
Schleicher Motor Vehicle Co	New York City	Schleicher										1		1				1		
Schmidt Brothers	Chicago, Ill	Schmidt			1			1												
A. O. Smith Co	Milwaukee, Wis	Smith													1			1		
Spoerer's Sons Co	Baltimore, Md	Spoerer																		
Stapf & Co	Dunkirk, N. Y	Stapf																		
Swanson Motor Car Co	Chicago, Ill	Swanson																		
Sowers Motor Truck Co	Boston, Mass	Sowers									1									
Toledo Motor Truck Co	Toledo, O	Toledo										1			1			1		
Transit Motor Car Co	Louisville, Ky	Transit										1								
Trabold Truck Co	Johnstown, Pa	Trabold						1	1		1	1								
Brasie Mfg. Co	Minneapolis, Minn	Twin City							1											
Tiffin Wagon Co	Tiffin, O	Tiffin			1				1			1								
Toeppner Brothers	Bay City, Mich	Toeppner																		
Triumph Motor Car Co	Chicago, Ill	Triumph									1									
Tulsa Auto & Mfg. Co	Tulsa, Okla	Tulsa						1	1		1									
Tuttle Mfg. Co	Canastota, N. Y	Tuttle																		
Universal Motor Truck Co	Detroit, Mich	Universal									1			1						
U. S. Motor Truck Co	Cincinnati, O	U. S										1		1						
Universal Motor Co	Denver, Colo																			
Union Motor Truck Co	San Francisco, Cal	Union										1								
Velie Motor Car Co	Moline, Ill	Velie										1		1						
Veerac Motor Co	Anoka, Minn	Veerac							1											
Driggs Seabury Ordnance Corp	Sharon, Pa	Vulcan										1		1		1	1	1		1
Van Winkle Motor Truck Co	Atlanta, Ga	Van Winkle																		
Victor Auto Mfg. Co	St. Louis, Mo	Victor																		
Wade Commercial Car	Holly, Mich	Wade	1																	
Willys Overland Co	Lima, O	Willys-Utility							1											
Wichita Falls Motor Co	Wichita Falls, Tex	Wichita						1						1						
Willet Engine & Truck Co	Buffalo, N. Y	Willet						1												
Wagenhals Motor Co	Detroit, Mich	Wagenhals	1																	
Ware Motor Vehicle Co	St. Paul, Minn	Ware													1					
White Company	Cleveland, O	White						1	1		1			1				1		
Witt-Will Company	Washington, D. C	Witt-Will							1			1				1				
H. E. Wilcox Motor Car Corp	Minneapolis, Minn	Wilcox							1			1		1						
Walter Motor Truck Co	New York City	Walter								1		1		2	1	1		2	1	1
Washington Motor Car Co	Hyattsville, Md	Washington																		
Westman Motor Truck Co	Cleveland, O	Westman																		
White Star Motor & Eng. Co	Brooklyn, N. Y	White Star										1		1					1	
Zimmerman Mfg. Co	Auburn, Ind	Zimmerman			1															

Facts for Buyers of Gasoline Motor Trucks

TRUCKS UNDER 1-TON CAPACITY

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE		
					Width	Height	Length
Atterbury, A	1,500	.....	Optional	.....	3′ 6″	Opt.	Opt.
Bauer, A	1 000	$1,000	Open Ex	$1,150	3′ 7″	1′ 6″	6′
Bauer, B	1,500	1,000	Open Ex	1,250	3′ 7″	1′ 6″	7′
Bauer, C	1,000	1,000	Inclosed	1,250	3′ 7″	1′ 6″	6′
Bauer, D	1,500	1,000	Inclosed	1,350	3′ 7″	1′ 6″	6′
Bessemer, C	1,000	1,250	Optional	.....	Opt.	Opt.	Opt
Best, A	1,000	750	Open Ex	800	3′ 6″	2′ 7″	6′
Best, C	1,000	750	Panel	875	3′ 6″	2′ 7″	6′
Best, C	1,600	1,370	Open Ex	1,450	3′ 9″	2′ 9″	7′ 3″
Best, C	1,600	1,370	Panel	1,550	3′ 9″	2′ 9″	7′ 3″
Brown, ½ ton	1,500	1,650	Optional	.....	3′ 8″	4′ 8″	7′ 6″
Buckeye, VI	800	900	Covered	950	3′ 4″	4′ 4″	5′ 6″
Buckeye, VII	1,500	1,125	Optional	1,200	3′ 8″	....	6′
Buick, 3	1,000	1,000	Open Ex	1,100	3′ 7″	Opt	5′ 2½″
Buick, 3	1,000	1,000	Stake	1,150	3′ 7″	Opt.	5′ 2½″
Buick, 3	1,000	1,000	Screen	1,200	3′ 7″	Opt.	5′ 2½″
Buick, 3	1,000	1,000	Panel	1,250	3′ 7″	Opt.	5′ 2½″
Buick, 4	1,500	1,125	Open Ex	1,250	3′ 7″	Opt.	8′ 2″
Buick, 4	1,500	1,125	Stake	1,300	3′ 7″	Opt.	8′ 2″
Buick, 4	1,500	1,125	Screen	1,350	3′ 7″	Opt.	8′ 2″
Butler, 1914	1,500	1,650	Express	1,775	4′	....	8′ 8″
Chase, 1,000-lb	1,000	855	Optional	900	3′ 8¼″	10″	10′
Commerce, 1,000-lb	1,000	875	Panel	.....	3′ 5″	4′ 4″	5′ 4″
Dart, 750-lb	750	.....	.....	800	.....	.....	.....
Dart, B	1,500	1,300	Express	1,300	3′10″	1′	....
Dispatch, 1914	1,200	825	Open	850	3′ 4″	.....	6′
Dispatch, 1914	1,200	825	Panel	900	3′ 4″	.....	6′
Dorris, ½-ton	1,500	2,100	Optional	.....	Opt.	Opt.	Opt.
Fargo, E	1,500	800	Express	900	3′ 9″	....	6′ 6″
Gabriel, K	.....	1,000	Optional	.....	Opt.	Opt.	Opt.
Geneva, 2	1,100	1,250	Panel	1,350	3′ 9″	4′ 7″	4′10″
Geneva, 2	1,200	1,250	Open Ex	1,300	3′ 9″	....	5′ 3″
Hupmobile, 32	800	.....	Inclosed	1,075	3′ 4″	4′ 8″	4′ 4″
International, MW	1,000	.....	Optional	.....	3′ 6″	11″	6′ 4″

TRUCKS UNDER 1-TON CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE		
					Width	Height	Length
International, MA	1,000	.....	Optional	.....	3′ 6″	11″	6′ 4″
Jeffery, 1514	1,500	.....	Optional	.....	Opt.	Opt.	Opt.
Kearns, A	1,500	$850	Open Ex	$1,175	3′ 6″	1′ 8″	6′
Kearns, A	1,500	850	Panel	1,200	3′ 4″	5′	5′
Kisselkar	1,500	1,500	Express	1,625	3′ 8″	....	7′
Kosmath, 1914	1,000	850	Optional	900	3′ 8″	Opt.	5′ 7″
Krebs, 3	1,000	950	Optional	.....	3′ 6″	4′ 8″	5′ 7″
Krebs, DB	1,500	1,425	Screen	1,600	3′10″	4′10″	6′10″
Krebs, DB	1,500	1,425	Panel	.....	3′10″	5′	6′ 8″
Landshaft, C	1,500	1,000	Express	1,075	3′ 7″	....	7′ 3″
Light, 800-lb	800	475	.....	.....	3′ 8″	2′ 2″	1500
Lippard-Stewart, CI	500	1,650	Optional	.....	Opt.	Opt.	Opt.
Macarr, A	1,500	1,650	Express	1,825	3′ 7″	5′	7′
Marmon, Del	1,500	2,500	Optional	.....	2′10″	.....	4′ 4″
Menominee, A-3	1,500	1,125	Express	1,200	3′ 6″	.....	6′ 6″
Menominee, A-3	1,500	1,125	Stake	1,200	5′	.....	7′
Mercury, P	1,000	.....	Open Ex	750	3′ 2″	10″	6′
Mercury, P	1,000	.....	Canvas Pan	850	3′ 2″	4′ 6″	6′
Mercury, P	1,000	.....	Wood Pan	870	3′ 2″	4′ 6″	6′
Mercury, P	1,000	.....	Fore Door	900	3′ 2″	4′ 6″	6′
Miller, A	1,000	800	Optional	.....	3′ 8″	4′ 6″	5′ 7′
Modern, F	1,500	1,500	Optional	.....	Opt.	Opt.	Opt.
Monitor, G	1,000	1,050	Express	1,050	3′ 6″	.....	6′ 8″
Moon, A	1,000	1,350	Optional	1,450	4′	.....	6′
Moreland, ¾-ton	1,500	1,700	Optional	.....	Opt.	Opt.	Opt.
O. K., A	1 200	800	Optional	850	4′ 8″	5′10″	11′ 8″
Overland, 79	800	.....	Express	900	3′ 6″	.....	5′ 1″
Overland, 79	800	.....	Panel	9o0	2′ 8″	4′ 4″	5′ 4″
Palmer-Moore, C	1,600	1,350	Optional	.....	3′ 8½″	.....	6′ 8″
Perfex 18	1,000	875	Optional	.....	3′ 6″	.....	5′ 6″

Facts for Buyers of Gasoline Motor Trucks

TRUCKS UNDER 1-TON CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE Width	Height	Length
Rockford, ½-ton	1,500	$1,500	Optional	.....	Opt.	Opt.	Opt.
Service, J	1,500	1,350	Optional	.....	Opt.	Opt.	Opt.
Sievert, H	1,500	1,250	Optional	$1,350	3′ 8″	1′ 5″	7′
Signal, ½-ton	1,500	1,350	Optional	1,450	3′10″	.....	8′
Signal, ½-ton	1,500	1,350	Open Pan	1,525	3′10″	4′ 6″	8′
Signal, ½-ton	1,500	1,350	Inclosed Pan	1,550	3′10″	4′ 6″	8′
Signal, ½-ton	1,500	1,350	Express	1,500	3′10″	4′ 6″	8′
Stegeman, ½-ton	1,500	1,600	Optional	.....	Opt.	Opt.	8′
Stewart, ½-ton	1,500	1,500	Panel	1,650	3′ 8″	5′	7′
Stewart, ½-ton	1,500	1,500	Top Ex	1,625	3′ 8″	5′	7′
Stewart, ½-ton	1,500	1,500	Open Ex	1,625	3′ 8″	.....	7′
Stewart, ½-ton	1,500	1,500	Screen	1,650	4′ 8″	5′	7′
Stewart, ½-ton	1,500	1,500	Stake	1,625	4′ 8″	.....	7′
Studebaker, Del	1,500	1,050	Panel	1,150	3′ 5½″	.....	5′11″
Studebaker, Del	1,500	1,050	Express	1,150	3′ 7″	.....	6′ 1″
Tiffin, A	1,200	1,600	Stake	.....	5′	.....	9′ 6″
Tiffin, A	1,200	1,600	Express	.....	4′ 8″	4′	9′
Tiffin, A	1,200	1,600	Furniture	.....	5′	4′ 8″	9′ 6″
Trabold, ½-ton	1,500	975	Express	1,075	.....	.....	8′
Wade, Del	800	400	Optional	425	3′	.....	8′
Wagenhals	800	.....	Optional	690	3′ 6″	2′ 6″	5′10″
White, GBBE	1,500	2,100	Optional	2,250	3′ 7″	5′	6′10″
Willys-Utility, 65	1,500	1,350	Express	1,400	3′10″	5′	8′
Willys-Utility, 65	1,500	1,350	Stake	.....	3′10″	3′	8′
Willys-Utility, 65	1,500	1,350	Screen	.....	3′10″	5′	8′
Willys-Utility, 65	1,500	1,350	Inclosed	.....	3′10″	5′	8′
Willys-Utility, 65	1,500	1,350	Flat Top	.....	3′10″	5′	8′
Willet, M	1,500	1,650	& Optional	.....	3′ 4″	.....	7′ 4″
Zimmerman							

TRUCKS OF 1 TO 2 TONS CAPACITY

Adams, A	2,000	$1,850	Flare Board	$2,215	3′10″	1′ 2″	9′
Adams, A	2,000	1,850	Flare Board	2,283	4′ 6″	1′ 4″	11′
Adams, A	2,000	1,850	Stake	2,218	3′10″	3′ 4″	9′
Adams, A	2,000	1,850	Stake	2,238	4′ 6″	3′ 4″	11′
Adams, D	3,000	2,300	Flare Board	2,443	4′ 2″	1′ 2″	11′
Admiral, C	3,000	1,475	Express	1,525	4′	2′10″	9′
Admiral, C	3,000	1,475	Stake	1,525	Opt.	2′10″	9′
Anglaize, H	2,000	950	Express	950	3′ 4″	10″	8′
Anglaize, G	2,000	1,350	Express	1,400	3′ 6″	10″	8′10″
Armleder, B	2,000	2,200	Express	2,400	4′ 2″	5′10″	9′
Armleder, B	2,000	2,200	Panel	2,550	4′	5′10″	8′
Armleder, B	2,000	2,200	Express	2,375	4′ 2″	5′10″	9′
Atterbury, B	2,000	.....	Optional	.....	4′	.....	8′
Autocar, F	3,000	.....	Optional	.....	4′ 3″	2′ 7″	9′
Available, 25	2,000	1,350	Express	1,450	3′ 8″	1′ 2″	8′ 6″
Available, 25	2,000	1,350	Furniture	1,500	5′	2′	9′ 6″
Available, 25	2,000	1,350	Grocers	1,500	3′ 8″	5′	8′ 6″
Available, 25	2,000	1,350	Panel Top	1,600	3′ 8″	5′	8′ 6″
Avery, 1-ton	2,000	1,690	Flare Board	.....	4′	.....	9′
Barker, U	2,000	2,000	Optional	2,075	3′ 8″	.....	11′
Blair, 1½-ton	3,000	2,850	Optional	.....	5′ 2″	Opt.	Opt.
Buckeye, V-4	3,000	1,900	Optional	2,000	3′10″	.....	7′10″
Chase, K	2,000	1,350	Optional	.....	3′ 8½″	1′ 2″	6′10″
Chase, H	2,000	1,200	Optional	1,250	3′ 8½″	1′ 2″	6′10″
Chase, L	3,000	1,675	Optional	1,750	4′ 2½″	1′ 4″	7′10″
Coleman, B	2,000	1,950	Stake	.....	4′ 6″	.....	8′ 6″
Coleman, B	2,000	1,950	Express	.....	3′10″	.....	8′ 6″
Continental	3,000	1,850	.....	.....	.....	.....	.....
Corbitt, F	2,500	2,000	Stake	2,085	4′	3′ 6″	11′
Corbitt, F	2,500	2,000	Flat	2,065	4′10″	3′ 6″	11′
Corbitt, F	2,500	2,000	Flare Board	2,075	4′	3′ 6″	11′
Crown, B	2,000	2,300	Optional	.....	Opt.	Opt.	9′
Danielson, A	3,000	2,000	Optional	.....	Opt.	Opt.	11′
Dart, C	3,000	1,775	Express	.....	3′10″	1′ 2½″	.....
Diamond, T. J	3,000	2,250	Optional	.....	Opt.	Opt.	Opt.
Federal	.....	1,800	.....	.....	.....	.....	.....
Four Wheel Drive, G	3,000	3,600	Optional	.....	Opt.	Opt.	Opt.
Gabriel, H	.....	1,500	Optional	.....	Opt.	Opt.	Opt.

TRUCKS OF 1 TO 2 TONS CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE Width	Height	Length
Gay, F	2,000	$1,475	Optional	$1,575	3′10″	.....	8′
Gay, G	3,000	1,675	Optional	1,775	4′	.....	9′
G. M. C., VC	2,500	1,900	Flare Board	2,062	4′ 6″	1′10″	10′
G. M. C., VC	2,500	1,900	Screen	2,145	4′ 6″	5′	10′
G. M. C., VC	2,500	1,900	Stake	2,040	4′ 6″	3′ 4″	10′
G. M. C., VC	2,500	1,900	Furniture	2,110	4′ 2″	5′	12′
G. A. Gramms, 1-ton	2,000	1,750	Optional	.....	Opt.	Opt.	Opt.
Harvey, D	3,000	1,875	Furniture	2,000	3′10″	1′ 6″	10′
Harvey, D	3,000	1,875	Stake	2,000	5′	3′	10′
Horner, 1-ton	2,000	2,000	Optional	.....	Opt.	Opt.	Opt.
Horner	3,000	2,250	Optional	.....	Opt.	Opt.	Opt.
Ideal, I	2,000	1,500	Optional	.....	3′ 8″	3′ 3″	8′ 6″
Ideal, H-2	3,000	2,000	Optional	.....	4′ 6″	3′ 4″	10′
Jeffery, 2014	2,000	.....	.....	.....	.....	.....	.....
Kalamazoo, B	3,000	1,590	Stake	.....	5′	.....	9′
Kalamazoo, B	3,000	1,590	Express	.....	4′1″	.....	8′ 9″
Kelly, K-30	2,000	2,000	Optional	.....	Opt.	Opt.	Opt.
Kisselkar, 1-ton	2,000	1,850	Stake	1,975	3′ 4″	.....	9′
Kisselkar, 1½-ton	3,000	2,100	Stake	2,250	5′ 5″	.....	8′
Koehler, 1-ton	2,000	725	Open Flare	750	4′	1′ 5″	7′
Koehler, 1-ton	2,000	725	Express	790	4′	4′ 7″	7′
Koehler, 1-ton	2,000	725	Canvas Side	800	3′ 8″	4′ 5″	7′
Koehler, 1-ton	2,000	725	Panel	900	3′ 6″	4′ 5″	7′
Koehler, 1-ton	2,000	725	Stake	750	3′ 8″	.....	7′
Koehler, 1-ton	2,000	725	Plumber	800	3′ 8″	1′	8′
Koehler, 1-ton	2,000	725	Baker	925	4′	4′ 8″	8′
Koehler, 1-ton	2,000	725	Furniture	825	4′ 2″	1′ 5″	9′
Krebs, AA	2,000	1,425	Flare Board	1,560	3′ 9″	.....	6′10″
Krebs, D	3,000	1,775	Optional	.....	3′10″	....	8′ 8″
Krebs, DD	3 000	1,775	Flare Board	.....	4′ 2″	....	9′ 8″
Krebs, DD	3 000	1,775	Stake	.....	5′ 6″	....	11′
Landshaft, J	3,000	1,800	Express	1,900	4′ 4″	....	10′
Lange, C	2,000	2,250	Optional	.....	Opt.	Opt.	Opt.
Lauth-Juergens, K	2,000	2,100	.....	.....	....	....	....
Lippard-Stewart, F	3,000	2,300	.....	.....	....	....	....
Little Giant, F	2,000	1,200	Flare Board	1,275	3′ 8″	1′ 1″	9′ 6″
Little Giant, F	2,000	1,200	Canvas Top	1,325	3′ 8″	4′ 9″	9′ 6″
Little Giant, F	2,000	1,200	Stake	1,300	3′ 8″	2′ 6″	9′ 6″
Little Giant, F	2,000	1,200	Panel	1,375	....	....	....
Little Giant, H	2,000	1,350	Flare Board	1,425	3′ 8″	1′ 1″	9′ 6″
Little Giant, H	2,000	1,350	Canvas Top	1,475	3′ 8″	4′ 9″	9′ 6″
Little Giant, H	2,000	1,350	Stake	1,450	3′ 8″	2′ 6″	9′ 6″
Little Giant, H	2,000	1,350	Panel	1,525	....	....	....
Lord Baltimore, B	2,000	1,800	Screen	2,000	3′10″	6′	9′
Maccarr, B	2,000	1,900	Express	2,100	3′10″	5′ 6″	8′ 6″
Maccarr, C	3,000	2,150	Express	2,250	3′10″	5′ 6″	9′ 6″
Mack, 1-ton	2,000	2,000	Optional	.....	Opt.	Opt.	Opt.
Mais, C	3,000	2,750	Optional	.....	5′	....	8′ 3″
Mais, D	3,000	2,800	Optional	.....	5′	....	10′ 6″
Martin, S	3,000	.....	.....	.....	....	....	....
Menominee, B-3	2,000	1,400	Express	1,500	3′10″	....	8′ 6″
Menominee, B-3	2,000	1,400	Stake	1,500	5′	....	8′ 6″
Menominee, C	3,000	1,800	Optional	1,950	....	....	10′
Modern, G	2,000	1,700	.....	.....	....	....	....
Modern, H	3,000	1,950	.....	.....	....	....	....
Monitor, D	2,000	1,650	Optional	1,750	4′	....	8′
Moon, B	3,000	1,800	Open Ex	1,900	3′10″	....	8′6″
Moon, B	3,000	1,800	Stake	1,950	3′10″	....	8′ 6″
Moor, B	3,000	1,800	Inclosed	1,950	3′10″	....	7′ 8″
Moon, B	3,000	1,800	Furniture	2,150	5′	....	9′
Moon, B	3,000	1,800	Top Stake	2,050	5′	....	8′ 5″
Moore, 1½-ton	3,000	1,950	Optional	.....	Opt.	Opt.	9′ 6″
Mora, 24	2,000	1,400	Open Ex	1,515	3′ 9″	....	7′ 6″
Nateo, 15	2,000	1,925	Optional	.....	Opt.	Opt.	Opt.
Nelson-LeMoon, D-1	2,000	1,800	Optional	.....	Opt.	Opt.	Opt.
New York	.....	2,000	Optional	.....	Opt.	Opt.	Opt.
O. K., A	2,000	800	Stake	1,520	5′	....	10′
Palmer-Meyer, 1-ton	2,000	1,600	Optional	.....	4′ 2″	....	6′ 2″
Palmer-Meyer, 1½-ton	3,000	1,975	Optional	.....	4′ 2″	....	....
Pathfinder, 1-ton	2,000	.....	Stake	.....	5′ 4″	....	5′11″
Pathfinder, 1-ton	2,000	.....	Inclosed	.....	3′ 8″	4′ 3″	6′ 8″
Progress, A	3,000	.....	Brewery	2,900	5′	3′	10′
Progress, A	3,000	.....	Express	2,850	5′	1′	10′
Progress, A	3,000	.....	Platform	2,800	5′	4′	10′

Facts for Buyers of Gasoline Motor Trucks

TRUCKS OF 1 TO 2 TONS CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE Width	Height	Length
Sanford, K	2,000	$1,660	Optional	$1,750	Opt.	Opt.	Opt.
Sanford, L	3,000	1,910	Optional	2,060	Opt.	Opt.	Opt.
Selden, J	.....	2,000	.....	.....	....	....	....
Service, Q	3.000	1,800	Optional	.....	Opt.	Opt.	Opt.
Service, K	2.000	1,475	Optional	.....	Opt.	Opt.	Cpt.
Service, M	3.000	1,675	Optional	.....	Opt.	Opt.	Opt.
Star, B	2,000	1,500	Optional	1,600	5′	2′10″	7′
Star, A	3,000	1,800	Optional	1,950	5′	3′	10′ 8″
Stegeman, 1-ton	2,000	2,250	Optional	.....	Opt.	Opt.	Opt.
Sullivan, 51	2,000	1,050	Express	1,140	3′10″	2′10″	7′ 6″
Sullivan, 51	2,000	1,050	Stake	1,140	4′	2′10″	7′ 6″
Tiffin, G	2,000	2,000	Stake	.....	5′ 6″	....	10′
Tiffin, G	2,000	2,000	Express	.....	4′ 8″	4′	9′
Tiffin, G	2,000	2,000	Furniture	.....	5′ 6″	5′	10′
Tiffin, G	2,000	2,000	Coal	.....	4′	....	9′
Tiffin, G	2,000	2,000	Brewers' Case	.....	5′ 6″	....	10′
Trabold, C	2,000	1,475	Express	1,575	3′11″	3′ 2″	9′
Trabold, 1½-ton	3,000	.....	Express	1,900	Opt.	3′ 2″	9′ 6″
Universal, T	3,000	1,950	Stake	2,000	5′ 2″	3′ 4″	10′
Universal, C	3,000	1,950	Express	2,050	3′ 8″	2′10″	10′
Veerac, B	2,000	1,100	Express	1,150	3′ 6″	9′ 6″	7′ 4″
Veerac, B	2,000	1,100	Stake	1,175	4′11″	....	7′ 4″
Veerac, B	2,000	1,100	Inclosed	1,250	3′ 6″	4′ 4″	7′ 4″
White, TBC	3,000	3,000	Platform	3,150	....	....	....
White, TBC	3,000	3,000	Express	3,150	4′ 4″	5′ 6″	9′ 2″
Wichita, A	2,000	1,650	Stake	1,775	5′	....	8′ 6″
Wilcox, L	2,000	.....	.....	.....	....	....	....

TRUCKS OF 2 TO 3 TONS CAPACITY

Adams, E	4,000	$2,500	Flare Board	$2,690	5′	1′ 2″	11′
Adams, E	4,000	2,500	Platform	2,643	5′	2′ 6″	11′
Armleder, H	4,000	2,150	Express	2,350	4′ 2″	5′10″	11′
Armleder, H	4,000	2,150	Panel	2,450	4′ 2″	5′10″	9′10″
Armleder, H	4,000	2,150	Stake	2,325	4′ 2″	5′10″	9′11″
Armleder, H	4,000	2,150	Furniture	2,450	5′ 6″	6′ 6″	11′
Armleder, E	5,000	2,500	Express	2,750	4′ 2″	5′10″	11′
Armleder, E	5,000	2,500	Ice	2,750	4′	4′	9′
Armleder, E	5,000	2,500	Bottle Beer	2,800	4′ 2″	6′	9′
Armleder, E	5,000	2,500	Furniture	2,850	5′ 6″	6′ 6″	11′
Armleder, E	5,000	2,500	Coal	2,800	4′ 4″	2′	9′
Armleder, E	5,000	2,500	Brewery	2,800	4′ 4″	3′ 6″	10′
Atterbury, C	4,000	.....	Optional	.....	5′	Opt.	10′
Avery, B	4,000	2,700	Optional	. ....	Opt.	Opt.	Opt.
Bessemer, B	4,000	1,800	Optional	. ....	Opt.	Opt.	Opt.
Blair, D	5,000	3,250	Optional	.....	Opt.	Opt.	Opt.
Buckeye, V-5	4,000	2,200	Optional	2,300	3′10″	....	7′10″
Chase, J	4,000	2,100	Optional	2,200	4′ 6″	1′ 4″	9′10″
Coleman, C	4,000	2,400	Stake	.....	5′ 6″	....	10′ 6″
Coleman, C	4,000	2,400	Express	.....	4′	....	10′ 6″
Crown, C	4,000	3,000	Optional	.....	Opt.	Opt.	11′
De Kalb, D-2	4,000	2,600	Platform	.....	5′	Opt.	Opt.
De Kalb, D-2	4,000	2,600	Express	.....	5′	Opt.	Opt.
Dorris, 2-ton	4,000	2,500	Optional	.....	Opt.	Opt.	Opt.
Gabriel, L	.....	2,500	Optional	.....	Opt.	Opt.	Opt.
Garford, L	4,000	2,800	Optional	.....	Opt.	Opt.	Opt.
G. M. C., SC	4,000	2,600	Flare Board	2,770	5′	2′ 1″	10′
G. M. C., SC	4,000	2,600	Screen	2,855	5′	5′	10′
G. M. C., SC	4,000	2,600	Stake	2.747	5′	3′ 4″	10′
G. M. C., SC	4,000	2,600	Furniture	2,825	5′ 6″	5′	11′
B. A. Gramm, 2-ton	4,000	2,750	Optional	.....	Opt.	Opt.	Opt.
Horner, 2-ton	4,000	2,650	Optional	.....	Opt.	Opt.	Opt.
Ideal, K	5,000	2,500	Optional	.....	5′	3′ 5″	12′
Kisselkar, 2½-ton	5,000	2,750	Stake	2,900	5′11″	....	10′
Knox, R-3	4,000	3,000	Optional	.....	Opt.	Opt.	Opt.
Lange, B	4,000	3,000	Optional	.....	4′ 6″	Opt.	10′ 6″
Lauth-Juergens, L	4,000	2,800	Optional	.....	Opt.	Opt.	Opt.
Lewis, 21	5,000	3,500	Optional	.....	Opt.	Opt.	Opt.
Lord Baltimore, D	4,000	2,300	Screen	2,500	5′	6′	10′

TRUCKS OF 2 TO 3 TONS CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE Width	Height	Length
Mais, E	4,000	$2,950	Optional	.....	5′	....	10′ 6″
Mais, F	4,000	3,000	Optional	.....	5′	....	12′ 3″
Mais, G	5,000	3,400	Optional	.....	....	....	....
Martin, E	5,000	.....	Optional	.....	Opt	Opt.	Opt.
Mogul, L	4,000	2,360	Express	.....	4′	....	11′
Mogul, L	4,000	2,360	Stake	.....	4′	....	11′
Mogul, L	4,000	2,360	Furniture	.....	5′	....	14′
Mogul, G	4,000	2,750	Optional	.....	5′	....	11′
Moore, 2-ton	4,000	2,500	Optional	.....	Opt.	Opt.	11′ 6″
Moreland, 2-ton	4,000	2,350	Optional	.....	Opt.	Opt	Opt.
Nelson-LeMoon, D-2	4,000	2,250	Optional	.....	Opt.	Opt.	Opt.
Packard, 2-ton	4,000	2,800	Optional	.....	Opt.	Opt.	Opt.
Pierce-Arrow, X-2	4,000	3,000	Optional	.....	Opt.	Opt.	Opt.
Reo, J	4,000	1,650	Optional	$1,800	5′ 6″	....	9′10″
Rockford, 2-ton	4,000	2,500	Optional	.....	Opt.	Opt.	Opt.
Schacht, 2-ton	4,000	2,650	Optional	....	Opt.	Opt.	11′
Service, P	4,000	2,375	Optional	.....	Opt.	Opt.	Opt.
Speedwell, Y	4,000	2,850	Box	2,950	6′	1′	10′ 6″
Speedwell, Y	4,000	2,850	Stake	2,950	6′	4·	10′ 6″
Stageman, 2-ton	4,000	2,950	Optional	.....	Opt.	Opt.	Opt.
Sternberg, 2-ton	4,000	2,800	Optional	.....	Opt.	Opt.	Opt.
Sternberg, 2-ton	5,000	3,250	Optional	.....	2′10″	3′10″	10′4½″
Tiffin, M	4,000	2,600	Stake	.....	6′	....	11′ 2″
Tiffin, M	4,000	2,600	Express	.....	5′	4′ 6″	10′ 6″
Tiffin, M	4,000	2,600	Furniture	.....	6′	5′	12′
Tiffin, M	4,000	2,600	Coal	.....	4′ 2″	....	10′
Tiffin, M	4,000	2,600	Brewery	.....	6′	....	11′ 2″
Trebold, 2-ton	4,000	2,450	Express	2,550	5′ 6″	3′ 2″	12′
Transit, F	4,000	2,850	Optional	.....	Opt.	Opt.	14′
Twin City, 2-ton	4,000	1,350	Optional	.....	4′	....	10′
U. S., E	4,000	2,800	Optional	.....	Opt.	Opt.	10′
Velie, Y	4,000	2,850	Optional	3,000	5′	Opt.	Opt.
Vulcan, 2-ton	4,000	2,750	Optional	.....	Opt.	Opt.	Opt.
Ware, A	.....	3,000	Optional	.....	Opt.	Opt.	Opt.
Wichita, B	4,000	2,100	Stake	2,250	5′10″	....	9′ 3″
Wilcox, N	4,000	.....	Optional	.....	Opt.	Opt.	Opt.

TRUCKS OF 3 TO 4 TONS CAPACITY

Atterbury, B	6,000	.....	Optional	.....	6′	....	12′
Avery, B	6,000	$3,200	Standard	.....	6′ 4″	....	12′ 6″
Avery, A	6,000	3,200	Farm	.....	4′ 4″	....	10′ 4″
Bessemer, A	6,000	2,100	Optional	.....	Opt.	Opt.	Opt.
Blair, E	7,000	3,750	Optional	.....	Opt.	Opt.	Opt.
Diamond, T. G	6,000	3,350	Optional	.....	Opt.	Opt.	14′
Four Wheel Drive, B	6,000	4.000	Stake	$4,150	5′	3′	11′
Four Wheel Drive, B	6,000	4,000	Optional	.....	Opt.	Opt.	Opt.
Garford, J	6,000	3,500	Optional	.....	Opt.	Opt.	Opt.
G. M. C., H	7,000	3,250	Flare Board	3,565	5′ 6″	5′ 6″	14′
G. M. C., H	7,000	3,250	Brewery	3,497	5′ 6″	6′	14′
G. M. C., H	7,000	3,250	Furniture	3,520	6′	6′	14′
G. M. C., HU	7,000	3,500	Flare Board	3,795	5′ 6″	5′ 6″	12′
G. M. C., HU	7,000	3,500	Brewery	3,732	5′ 6″	6′	12′
G. M. C., HU	7,000	3,500	Furniture	3,755	6′	6′	13′
B. A. Gramm, 3½-ton	7,000	3,600	Optional	.....	Opt.	Opt.	Opt.
Horner, 3-ton	6,000	3,200	Optional	.....	Opt.	Opt.	Opt.
Kelly, K-40	6,000	3,400	Optional	.....	Opt.	Opt.	Opt.
King, 3	7,000	3,350	Optional	.....	Opt.	Opt.	13′
Kisselkar, 3½-ton	7,000	3,350	Stake	3,500	6′	....	13′
Knickerbocker, 3	6,000	3,750	Optional	.....	Opt.	Opt.	Opt.
Lauth-Juergens, M6	6,000	3,450	Optional	.....	Opt.	Opt.	Opt.
Lewis, 21S	6,000	3,250	Optional	.....	Opt.	Opt.	Opt.
Mais, H	6,000	3,400	Optional	.....	5′	....	14′
Martin, L	7,000	.....	Optional	.....	Opt.	Opt.	Opt.

Facts for Buyers of Gasoline Motor Trucks

TRUCKS OF 3 TO 4 TONS CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE Width	Height	Length
Moore, 3-ton	6,000	$3,150	Optional	.....	Opt.	Opt.	Opt.
Nelson-LeMoon, D-3	6,000	2,750	Optional	.....	Opt.	Opt.	Opt.
Nevada, H	6,000	3,500	Optional	.....	Opt.	Opt.	Opt.
Packard, 3-ton	6,000	3,400	Optional	.....	Opt.	Opt.	Opt.
Progress, O	6,000	3,500	Brewery	$3,700	6′	3′ 6″	12′
Progress, O	6,000	3,500	Trunk	3,600	6′	....	12′
Progress, O	6,000	3,500	Package	3,700	6′	3′ 6″	12′
Progress, O	6,000	3,500	Bottle	3,800	5′ 9″	....	14′ 3″
Peerless, 3-ton	6,000	3,700	Platform	.....	6′	Opt.	Opt.
Pope-Hartford, 3-ton	6,000	3,350	Platform	3,550	6′ 6″	Opt.	14′
Service, H	6,000	2,975	Optional	.....	Opt.	Opt.	Opt.
Standard, 3-ton	6,000	2,750	Exp. & Stake	3,050	Opt.	Opt	12′ 3″
Standard, 3-ton	6,000	2,750	Dump	3,350	Opt.	Opt.	10′
Standard, 3-ton	6,000	2,750	Van	3,500	Opt.	Opt.	18′
Stegeman, 3-ton	6,000	3,500	Optional	.....	Opt.	Opt.	12′
Sternberg, 1914	6,000	3,400	Optional	.....	Opt.	Opt.	Opt.
Transit, T	7,000	3,500	Optional	.....	Opt.	Opt.	14′
Universal, A	3,000	3,400	Stake	3,550	6′	3′ 8″	Opt.
U. S., D	6,000	3,500	Optional	.....	Opt.	Opt.	12′
Velie, C	6,000	3,350	Standard	3,500	6′	Opt.	Opt.
Vulcan, 3-ton	6,000	3,250	Optional	.....	Opt.	Opt.	Opt.
White, GTA	6,000	3,700	Standard	3,850	6′ 5″	....	13′
Wichita, H	7,000	3,250	Stake	3,450	7′	3′ 8″	13′
Wilcox, JA	6,000	.....	.....	.....	....	....	....
Willet, L	6,000	2,800	Optional	.....	6′	Opt.	Opt.

TRUCKS OF 4 TO 5 TONS CAPACITY

Garford, K	8,000	$3,850	Optional	.....	Opt.	Opt.	Opt.
Knickerbocker, 4	8,000	4,000	Optional	.....	Opt.	Opt.	Opt.
Longest, 3-A	8,000	4,000	Optional	.....	Opt.	Opt.	Opt.
M & E, 4-ton	8,000	2,750	Stake	$3,000	6′	....	12′
Mogul, O	8,000	3,800	Optional	.....	Opt.	Opt.	11′ 6″
Moore, 4-ton	8,000	3,900	Optional	.....	Opt.	Opt.	Opt.
Packard, 4-ton	8,000	3,550	Optional	.....	Opt.	Opt.	Opt.
Peerless, 4-ton	8,000	4,000	Platform	.....	6′	Opt.	Opt.
Speedwell, Z	8,000	3,750	Box	3,850	6′ ″6	1′	12′ 6″
Speedwell, Z	8,000	3,750	Stake	3,850	6′ 6″	4′	12′ 6″
Standard, 3-ton	8,000	2,750	Keg	3,050	Opt.	Opt.	18′
Standard, 3-ton	8,000	2,750	Tank	3,300	Opt.	Opt.	18′
Stegeman, 4-ton	8,000	3,950	Optional	.....	Opt.	Opt.	Opt.
Sternberg, 4-ton	8,000	.....	Optional	.....	Opt.	Opt.	Opt.
Vulcan, 4-ton	8,000	4,000	Optional	.....	Opt.	Opt.	Opt.
Vulcan, 4½ ton	9,000	4,250	Optional	.....	Opt.	Opt.	Opt.

TRUCKS OF 5 TONS CAPACITY

Atterbury, E	10,000	.....	Optional	.....	6′	....	14′
A. I. C., C	10,000	$3,500	Optional	.....	6′	....	12′ 6″
Avery, B-5	10,000	4,500	Stake	.....	6′ 4″	3′	14′
Diamond T, G	10,000	3,600	Optional	.....	Opt.	Opt.	14′
Garford D	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
G. M. C., KU	10,000	4,500	Flare Board	$4,815	6′	6′	13′
G. M. C., KU	10,000	4,500	Brewery	4,745	6′	6′	13′
G. M. C., KU	10,000	4,500	Furniture	4,770	6′	6′	14′
G. M. C., KU	10,000	4,500	Dump	5,100	3′10″	2′ 3″	12′
G. M. C., KUL	10,000	4,600	Lumber	4,750	4′5½″	4′	16′
G. M. C., K	10,000	4,250	Flare Board	4,575	6′	6′	14′
G. M. C., K	10,000	4,250	Brewery	4,502	6′	6′	14′
G. M. C., K	10,000	4,250	Furniture	4,520	6′	6′	14′
G. M. C., K	10,000	4,250	Dump	4,850	3′10″	2′ 3″	12′
B. A. Gramm, 5-ton	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
Horner, 5-ton	10,000	4,200	Optional	.....	Opt.	Opt.	Opt.
Knickerbocker, 5	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.

TRUCKS OF 5 TONS CAPACITY—Continued

NAME AND MODEL	Capacity, Pounds	Chassis Price	Body Style	Price with Body	LOAD SPACE Width	Height	Length
Lewis, 51	10,000	$4,750	Optional	.....	Opt.	Opt.	Opt.
Locomobile, A	10,000	4,800	Optional	.....	Opt.	Opt.	Opt.
Mack, 5-ton	10,000	4,000	Optional	.....	Opt.	Opt.	Opt.
Moore, 5-ton	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
Moreland, 5-ton	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
Packard, 5-ton	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
Peerless, 5-ton	10,000	4,500	Platform	.....	6′	....	Opt.
Peerless, 5-ton	10,000	4,500	Hoist	.....	4′	2′ 3″	12′
Pierce-Arrow, R-5	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
Pope-Hartford, 5-ton	10,000	4,350	Stake	$4,550	6′ 6″	Opt.	14′
Pope-Hartford, 5-ton	10,000	4,350	Optional	.....	Opt.	Opt.	Opt.
Royal, A-5	10,000	4,500	Optional	.....	Opt.	Opt.	13′
Stearns, 5-ton	10,000	3,800	Platform	3,950	6′	5′	Opt.
Stearns, 5-ton	10,000	3,900	Platform	4,050	6′	5′	Opt.
Sternberg, 5-ton	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
Transit, V	10,000	4,500	Express	4,700	6′	Opt.	14′
Vulcan, 5-ton	10,000	4,500	Optional	.....	Opt.	Opt.	Opt.
White, TC	10,000	4,500	Standard	4,700	6′ 5″	....	13′

TRUCKS OF OVER 5 TONS CAPACITY

Couple Gear, AC	12,000	$5,600	Stake	$5,800	6′ 6″	....	14′
Couple Gear, AC	12,000	5,600	Canvas Top	6,000	6′ 6″	7′	14′
Couple Gear, AC	12,000	5,600	Panel	6,100	6′ 6″	7′	14′
Couple Gear, AC	12,000	5,600	Dump	6,100	4′ 6″	....	11′
Couple Gear, ACT	.....	5,550	Tractor	.....	Opt.	Opt.	Opt.
Garford, F	12,000	4,850	Optional	.....	Opt.	Opt.	Opt.
G. V., F V	12,000	.....	Optional	.....	Opt.	Opt.	Opt.
Kisselkar, 6-ton	12,000	4,350	Stake	4,500	6′	....	14′
Knox, Tractor	.....	3,250	.....	.....	....	....	....
Knox, Tractor	40,000	3,750	.....	.....	....	....	....
Knox, M-3	.....	4,100	Sing Tank	5,600	....	....	....
Knox, M-3	.....	4,100	Doub Tank	5,900	....	....	....
La France, 6-ton	12,000	5,500	Stake	.....	Opt.	Opt.	Opt.
Mogul, M	12,000	4,700	Optional	.....	Opt.	Opt.	Opt.
Mogul, U	12,000	4,750	Lumber	.....	6′	6′	15′10″
Packard, 6-ton	12,000	4,650	Optional	.....	Opt.	Opt.	Opt.
Peerless, 6-ton	12,000	.....	Platform	.....	6′	....	Opt.
Saurer, 6½-ton	13,000	5,800	Optional	.....	Opt.	Opt.	Opt.
Speedwell, X	12,000	4,400	Box	4,500	6′ 9″	1′	15′ 6″
Speedwell, X	12,000	4,400	Stake	4,500	6′ 9″	4′	15′ 6″
Sternberg, 6-ton	12,000	4,750	Optional	.....	Opt.	Opt.	Opt.
Sternberg, 7-ton	14,000	5,000	Optional	.....	Opt.	Opt.	Opt.
Vulcan, 7-ton	14,000	6,000	Optional	.....	Opt.	Opt.	Opt.

PUBLIC SERVICE VEHICLES

Armleder, B	.....	$2,200	Bus	$2,750	12 Passengers
Armleder, B	.....	2,200	Patrol	3,200	.....
Armleder, H	.....	2,150	Bus	2,750	16 Passengers
Croxton, T	.....	1,860	Taxicab	2,500	.....
Great Eagle, A	.....	.....	Ambulance	.....	.....
Great Eagle, A	.....	.....	Hearse	.....	.....
Great Eagle, D	.....	.....	Ambulance	3,500	to $6,000
Great Eagle, D	.....	.....	Hearse	3,500	to $6,000
Koehler, 1-ton	2,000	725	Bus	1,000	12 Passengers
Koehler, 1-ton	2,000	725	Hose Wagon	1,650	.....
Little Giant, F	.....	1,200	Bus	1,900	12 Passengers
Little Giant, H	.....	1,350	Bus	2,050	12 Passengers
Martin, B	3,000	.....	Fire Wagon	5,000	.....
Martin, A	4,000	.....	Fire Wagon	5,000	.....
Moon, B	.....	1,800	Bus	3,200	.....
S. & S., A	1,500	2,000	Ambulance	3,250	.....
S. & S., A	1,500	2,000	Hearse	3,500	.....
Stewart	1,500	1,500	Undertaker	2,100	.....
White, TBC	3,000	3,000	Bus	.....	.....
White, TBC	3,000	3,000	Fire Wagon	.....	.....
White, GBBE	1,500	2,100	Patrol	.....	.....
White, GBBE	1,500	2,100	Ambulance	.....	.....
White, GBBE	1,500	2,100	Hearse	.....	.....
Willys-Utility, 65	1,500	1,350	Bus	.....	.....

Gasoline Trucks for 1914

Products of 128 Manufacturers of Commercial Vehicles in the United States for Coming Season Briefly Described

ON this and the following pages THE AUTOMOBILE briefly describes the products of 128 manufacturers of motor trucks in the United States. The growth of the motor truck movement has been great during the past year, for the most astute and up-to-date merchants, contractors and other men throughout the country whose work calls for adequate transportation facilities are gradually coming to realize that for efficiency and economy the horse cannot begin to compare with the untiring, powerful motor truck.

With greater demand for its goods, the commercial vehicle industry has made commensurate progress in design and construction as well as in methods of disposing of the product. The modern motor truck is more simple, more durable and generally more efficient than ever before. In economy, too much has been done, especially in the way of adapting the machines to the use of fuels other than gasoline.

What some of our leading makers offer may be seen in the following descriptions.

Adams

Model A is the smallest vehicle, having a capacity of 1 ton, Model D is of 1½ tons capacity, Model E of 2 tons burden and Model F, also of 2 tons capacity, a new addition to the line, brought out early in the summer of 1913, is similar to Model E except in its wheelbase.

On the 1 and 1½ ton models two wheelbase options are offered, 121 or 136 inches respectively, on either model. Model E has a wheelbase of 140 inches and Model F 115 inches. From the motor the drive is taken by a dry-disk clutch faced with Raybestos. From this, the motive power is transmitted through a shaft by the gearset, which is of the selective three-speed pattern mounted as a unit with the jackshaft. Final drive is through exposed chains.—Adams Bros. Co., Findley, O.

American

Announced late in the 1913 season but not until the present time ready for the market, the American 1-ton truck is purely a 1914 product of the American Motor Truck Co., Detroit. It is built up of various standard parts, such as a Continental unit power plant, including a dry-disk clutch and a Brown-Lipe selective three-speed gearset. From the gearset the drive is taken by a shaft with two universals to a double-reduction live axle of Weston-Mott manufacture.

The motor is located under a straight-line hood with the radiator in front. Back of a steel dash is a steel seat and floor integral with the dash. The truck is controlled by a steering wheel on the left side, a hand and foot throttle, and center levers mounted directly on the cover of the gearbox.

Pressed steel in channel section is used in the frame, a single wheelbase of 132 inches being offered.

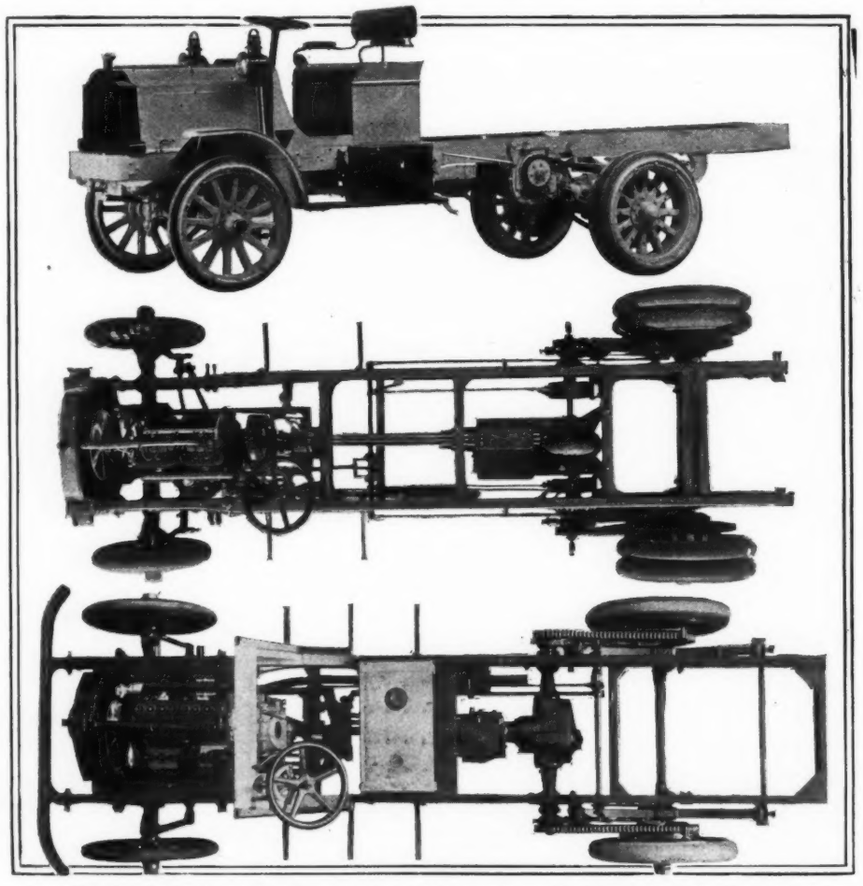
Armleder

Increasing an already comprehensive range of models of moderate capacity, the Armleder company is adding a new 3-tonner for the 1914 season. This addition expands the line so that it now ranges from 1 ton to 3 tons, comprising four models. The friction-driven 1,500-pounder which it formerly produced is not continued, except as a special job.

Outstanding features of the new 3-ton model are worm drive, dry-disk clutch, four-speed gearset, all brakes on the rear wheels, pressed steel frame, a governor driven from the gearset instead of the motor, and left steer with control levers in the center.

The 1-tonner is bevel driven, the rear axle being exceptionally heavy. In the 1-ton model the clutch and gearset are contained in a unit with the motor. In the chain-driven models these parts are in a unit with the jackshaft. Left steer and center control have always been used on Armleder vehicles.

The complete Armleder line consists of Model B, of 1-ton capacity and bevel drive; Model H, of 2 tons capacity and chain drive; Model E, of 2½-ton capacity and chain drive, and Model K, of 3 tons capacity with worm drive.



Top—2-ton Packard chassis. Middle—G.M.C. SC or VC chassis. Bottom—Kissel

Wheelbase options are offered at extra cost on all three of the models.

Atterbury

Plans of the Atterbury Motor Car Co., Buffalo, N. Y., for 1914 have not been definitely formulated up to the present time, but very interesting developments are promised.

As far as is known, worm drive will be used on all models up to 1½ tons capacity, and possibly on the 2-tonner, while chain drive will be continued on the 3 and 5-ton models. Option of right and left steer will be continued on the smaller models and right steer only on the 3 and 5-ton types.

The complete line for 1914 will be the same in capacity and model designations as the 1913 offering. It embraces Model A, a 1,500 pound light delivery vehicle, last year driven by an internal-gear and bevel axle, but which probably will be worm driven this year; Model B, a 1-tonner, chain driven in 1913, and probably worm driven for 1914; Model R, a 1½ ton type which will in all likelihood be worm driven this vear, although chain driven in 1913; Model C, of 2 tons capacity, formerly chain driven, and possibly worm driven for 1914, and Models D and E, of 3 and 5 tons capacity, respectively, which will be continued practically without change for 1914, retaining the chain drive.

Auglaize

Adding two new models to its line, the Auglaize Motor Car Co., New Bremen, O., enters the 1914 field with three models instead of but one. The capacity of the larger of the new models is 1 ton, while the smaller is 1,500 pounds, like the older model. The Auglaize truck has heretofore been made in a single model. This model has a two-cylinder motor under the seat, driving through a planetary gearset on the jackshaft to the rear wheels through double chains. Solid tires only are used on these vehicles.

The new models are substantially alike, and go by the same designation, Model G. Two chassis of 1,500 pounds and 1 ton capacity comprise the additions to the line. They are equipped with four-cylinder 3½ by 5 block cast motors located under a hood forward, driving through multiple disk clutches and selective gearsets to live rear axles of the internal-gear type.

Autocar

Model 21-F, which was announced in September, 1913, will constitute the 1914 offering of Autocars, made by Autocar Co., Ardmore, Pa. This model is in reality the same as Model 21, its immedate predecessor, with a few changes. The capacity of 3,000 pounds remains unchanged. The form of construction is identical.

The motor is the same two-cylinder horizontal opposed type.

It has two flywheels and is connected directly to the three-speed progressive gearset, and drives through a shaft to the double-reduction rear axle.

The Autocar is characterized by its short wheelbase, 97 inches, and the position of the driver's seat over the motor, with the gasoline tank behind it, being so hinged to the chassis that it may be elevated, exposing the entire power plant without disturbing any other portion. The frame is of armored hickory, reinforced with steel.

The short wheelbase made possible by the compact construction of the Autocar gives the vehicle a turning radius of 18½ feet, so that it may be turned about in a 37-foot street. Although 9 feet of load platform length is allowed, the total length of the vehicle is but 13 feet.

Available

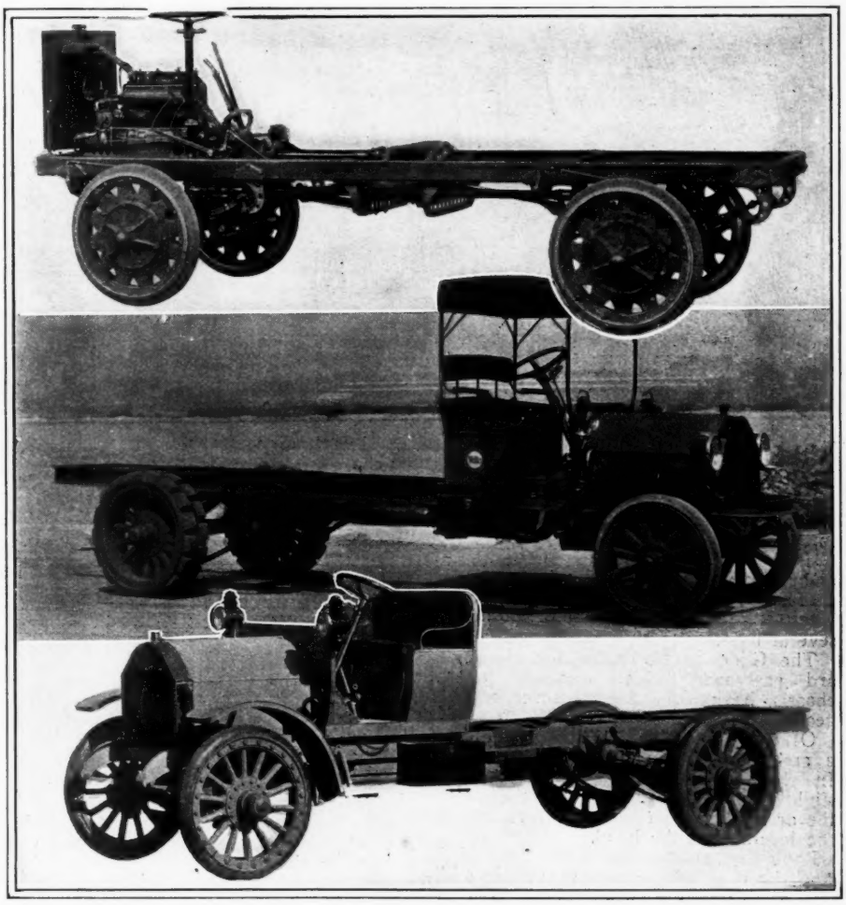
Continuation of its 1-ton delivery wagon will constitute the activity of the Available Truck Co., Chicago, in 1914. The only change that has been made is in the rear tires which have been changed from 36 by 3 to 36 by 3½.

A four-cylinder block motor, a three-speed selective gearset united with the jackshaft, with double chains, comprise the power plant and transmission system. Solid tires are used. The steering wheel is on the left side, with the levers also to the left.

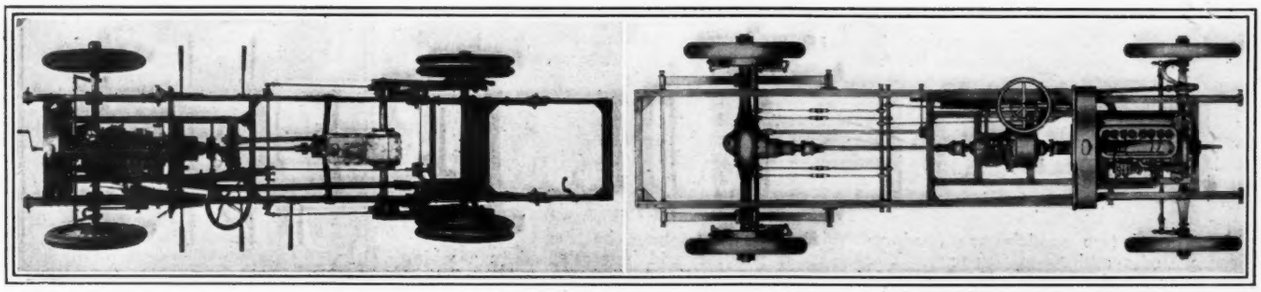
Avery

Of unusual comprehensiveness, the line of motor trucks manufactured by the Avery Co., Peoria, Ill., remains identical with that of 1913, except for the addition of a 1,500-pound shaft-driven delivery car built upon the Glide chassis.

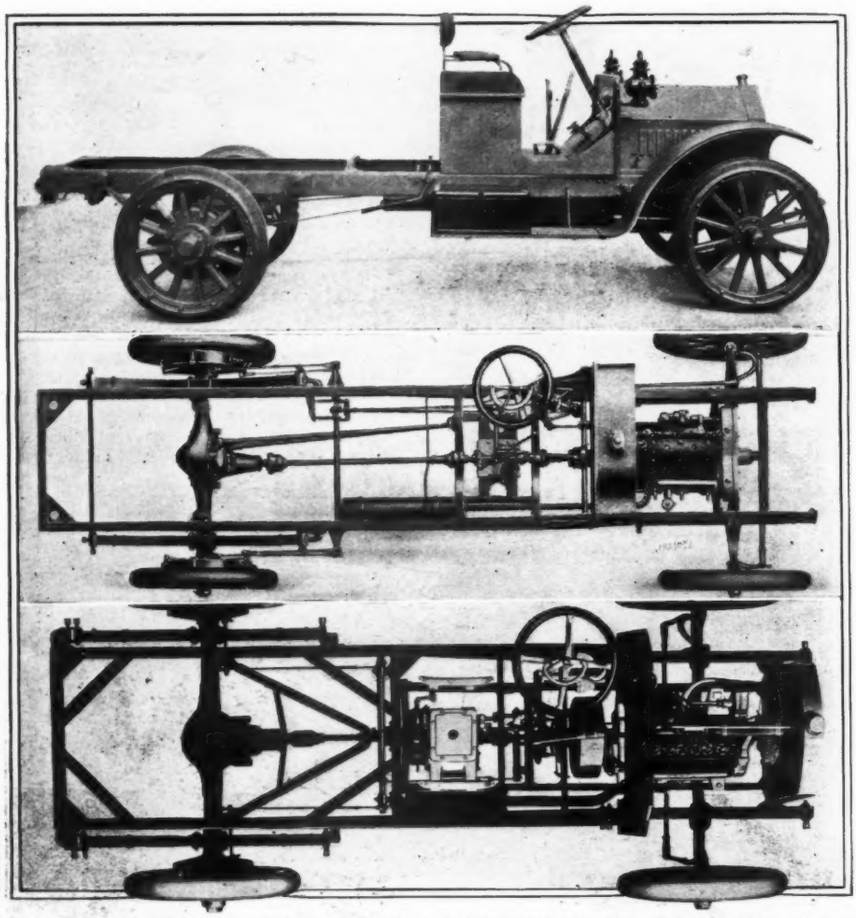
Starting with Type A the Avery company first entered the commercial vehicle business with a combination truck and tractor designed for use on the farm. This



Top—Chassis of Jeffery four-wheel drive. Middle—3-ton Velie. Bottom—Indiana



Left—Lange chassis, showing final drive by chain. Right—Stewart chassis, showing shaft drive



Top—Diamond T chassis. Middle—Plan view of Commerce chassis. Bottom—Plan view of Durant-Dort chassis

truck was later supplemented by Type B, intended purely for commercial use. Type C is the latest addition to the Avery line, and is intended for lighter work than that performed by either of the earlier models. These three divisions of types differ in several points.

The Glide 1,500-pounder follows standard passenger vehicle practice in the chassis, having shaft drive through bevel gears.

Of type A, two models are produced, of 2 and 3 tons load capacity, respectively. In these models the seats are located slightly behind and alongside the hoods, the driver being situated to the right, with the levers next the hood.

Bodies of various styles are carried in stock by the Avery company, and in addition to this it is equipped to provide special designs and trailers for Type A.

Type B is made in three capacities, 2 tons, 3 tons and 5 tons. The 2-ton and 3-ton models are virtually the same, except for their springs, gear ratios, tire sizes and other minor details directly affecting load capacity.

The 5-tonner, which has only been built one year, has a larger motor, operating at 1,000 revolutions per minute maximum speed, instead of 1,200, and has its cylinders cast in pairs instead of singly, and a longer wheelbase, 140 inches instead of 128 inches.

In Type C two models are produced. These are of 1 and 2 tons capacity. They are similar in the use of left steer and center control with exposed driving chains.

The 1-tonner has a block motor, 4⅛ by 5¼. It employs a dry-plate clutch, 5-inch channel frame and has a wheelbase of 128 inches.

The 2-ton model has the same individual-cylinder 4¾ by 5 motor used on all the other 2 and 3 ton chassis.

Beck

Simplicity, strength and durability are the aims of the Cedar Rapids Automobile Works, Cedar Rapids, Ia., in producing the Great Beck, a truck weighing 4,000 pounds and using a four-cylinder, 4 by 5-inch motor developing 35 horsepower. The machine has a three-speed gearset and uses left drive with center control. The wheelbase is 130 inches and the body loading space is 5 by 10 feet, though any style or size of body is fitted to suit the purchaser.

Bessemer

Ranging in size from light delivery to light trucking sizes, Bessemer motor trucks are produced in three models.

The complete line consists of a 1-tonner and a 1½-tonner, both worm driven and a 2-ton model, which is chain-driven. The first two mentioned are new models, and supersede two others of similar capacity, but with chain drive, which have been withdrawn from the market. The 2-tonner is continued practically without change except for improved brake equalizers. The 1-tonner has been found the most popular, and best adapted to a wide range of applications. The price of the 2-tonner has been reduced for 1914; the new models being offered at the same price as those they supersede.

All Bessemer trucks have left steer and center control.—Bessemer Motor Truck Co., Grove City, Pa.

Best and Flint

Continuing its 1,000 pound Model A and 1,600 pound Model C, under the names Best and Flint, respectively, the Durant-Dort Carriage Co., Flint, Mich., announces no changes for 1914. These vehicles differ in that the Best has a two-cylinder horizontal opposed motor under the floor, driving through a friction change-gear and double chains, and has elliptic springs in the rear, while the Flint has a four-cylinder vertical motor, located under a hood, fitted with a cone clutch, three-speed gearset and shaft drive through bevel gears.

Blair

The complete line made by the Blair Mfg. Co., Newark, O., consists of a 1½-ton, a 2½-ton, and a 3½-ton truck, identical in lay-out although differing in the size of parts directly in relation to the weight of the load.

The motor is a Continental, 4⅛ by 5¼. Final drive is through a straight-type overhead worm to the live rear axle.

Brockway

Continuation of its four models practically without change has been made for 1914 by the Brockway Motor Truck Co., Cortland, N. Y. These trucks are characterized by their three-cylinder two-cycle air-cooled motors, their high wheels, wood frames, French hoods, left drive, and elliptic springs in front. All four models follow practically the same lines.

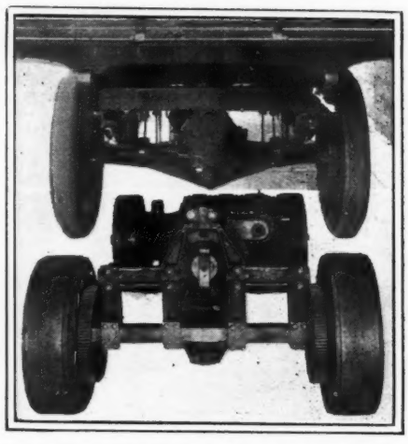
The complete line consists of Model A, rated at from 1,000 to 1,500 pounds; Model B, rated at from 2,000 to 2,500 pounds; Model C, rated at from 2,000 to 2,500 pounds; and Model D, rated at from 3,000 to 3,500 pounds. The principal difference between Models B and C is in the gearset, that on Model B being of the planetary type, and that on Model C of the selective sliding gear pattern.

For the first time, the Brockway is offering four-cycle motors of Continental manufacture on its models as optional equipment instead of the Brockway two-cycle engine.

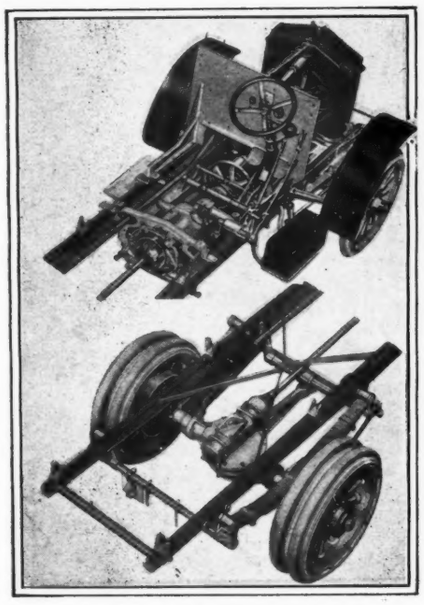
Left steer and center control are used on all models. On Models A and B a two-speed planetary gearset is employed, while on the others, three-speed selective gearsets and cone clutches are features.

Buick

The new Buick is unlike any previous production of this company. It is not like



Top—Rear construction on Standard-Cleveland. Bottom—Rear construction of Horner



Plan view of Pierce chassis

the passenger vehicles, for it uses an L-head motor instead of the valve-in-the-head type which has always characterized Buick passenger vehicle productions. All previous Buick commercial vehicles have had their motors under the floor boards and of the two-cylinder opposed type, driving through a planetary gearset by a chain.

Transmission is through a three-speed selective gearset and shaft drive to a bevel-gear rear axle of the semi-floating type in the new model.

The two chassis are designated No. 3 and No. 4, the former of 1,000 pounds capacity, 100-inch wheelbase, and 33 by 4½ tires; and the latter of 1,500 pound capacity with a 122-inch wheelbase, and 35 by 5 tires. The motor is 3 by 5, with valves on the right. The rear axle is of the semi-floating pattern, bevel driven. The drive shaft is inclosed in a tubular torsion member.

Clark

Late maturity of its plans prevents a full description of the Clark delivery car made by the Clark Delivery Car Co., Chicago. As far as is known at this writing it will have a 144-inch wheelbase, a pressed steel frame, its motor under a hood forward, a Continental motor, Brown-Lipe gearset, and a bevel-driven rear axle of a special design built in the Clark factory.

Features which distinguished this vehicle last season are retained. Prominent under this head is the radiator which has an aluminum base and top, into which ⅜-inch copper tubes are rolled and beaded to insure water-tightness.

Cleveland

Marketed by C. D. Paxson, Cleveland, O., and the Lewis Spring & Axle Co., Jackson, Mich., the Cleveland truck is one of the newcomers introduced in 1913. It is a light delivery vehicle of 1,500 pounds capacity mounted on pneumatic tires.

Its principal features are motor under the hood forward, a four-cylinder engine, pressed steel frame, and right steer and control.

The motor is 4½ by 4½ with the valves inclined at 45 degrees in the cylinder heads. The final drive is through a shaft which it is claimed is approximately straight when under load, to a bevel-driven rear axle of the semi-floating type.

Chase

To its five models ranging in capacity from 1,000 pounds to 2 tons, the Chase Motor Truck Co., Syracuse, N. Y., has just announced the addition of two new designs which are radical departures from the concern's previous practice. The older models are chain-driven from jackshafts and have two-cycle air-cooled motors. The newcomers are a 3-ton, worm-driven type with a four-cycle water-cooled engine. : a 3,000-pound model having side chains and jackshaft and four-cycle water-cooled engine also. The new 3-ton has two wheelbase lengths—148 and 165 inches and the standard body is 122 by 52. The 1 1-2 ton has 146 and 160. The new engines are Continentals, 4.5 by 5.5 and 4.125 by 5.25, respectively.

Commerce

Now 3 years old, practically no changes of moment have been made on Commerce light delivery trucks, which are made in a single chassis model of 1,000 pounds capacity. A friction change-gear is used, final drive being by a single chain to a semi-floating rear axle.

The steering wheel is to the left, with the change-speed lever also on this side.

Pneumatic tires are stock equipment, but for work in which speed is not essential, solid tires are fitted on option. The frame is of pressed steel, but one length being carried. No wheelbase options are offered, although a slight variation in body length is permitted.

Bodies in four different styles are carried by the Commerce company. These bodies are designed to cover all general classes of light delivery work, and it is stated that rarely are special bodies employed.—Commerce Motor Car Co., Detroit.

Corbitt

One of the few commercial vehicle builders located in the Southern territory is the Corbitt Automobile Co., Henderson, N. C., which produces a medium-sized truck rated at 2,500 pounds capacity.

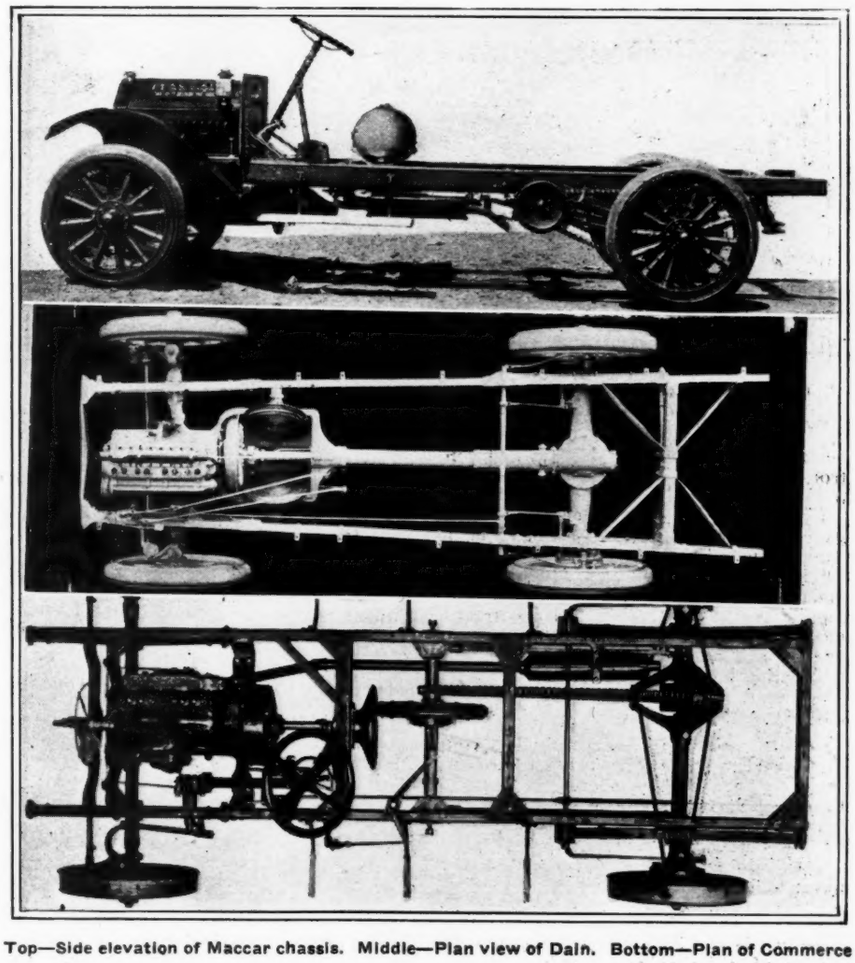
It is of the European type, the motor being located beneath the hood in front of the driver's compartment. It follows standard lines mechanically, having a selective gearset and chain drive.

The only change that has been made in the Corbitt since a year ago is the substitution of a Hele-Shaw multiple-disk clutch for the cone type used in former years. The motor is a Continental L-head type, 3¾ by 5¼.

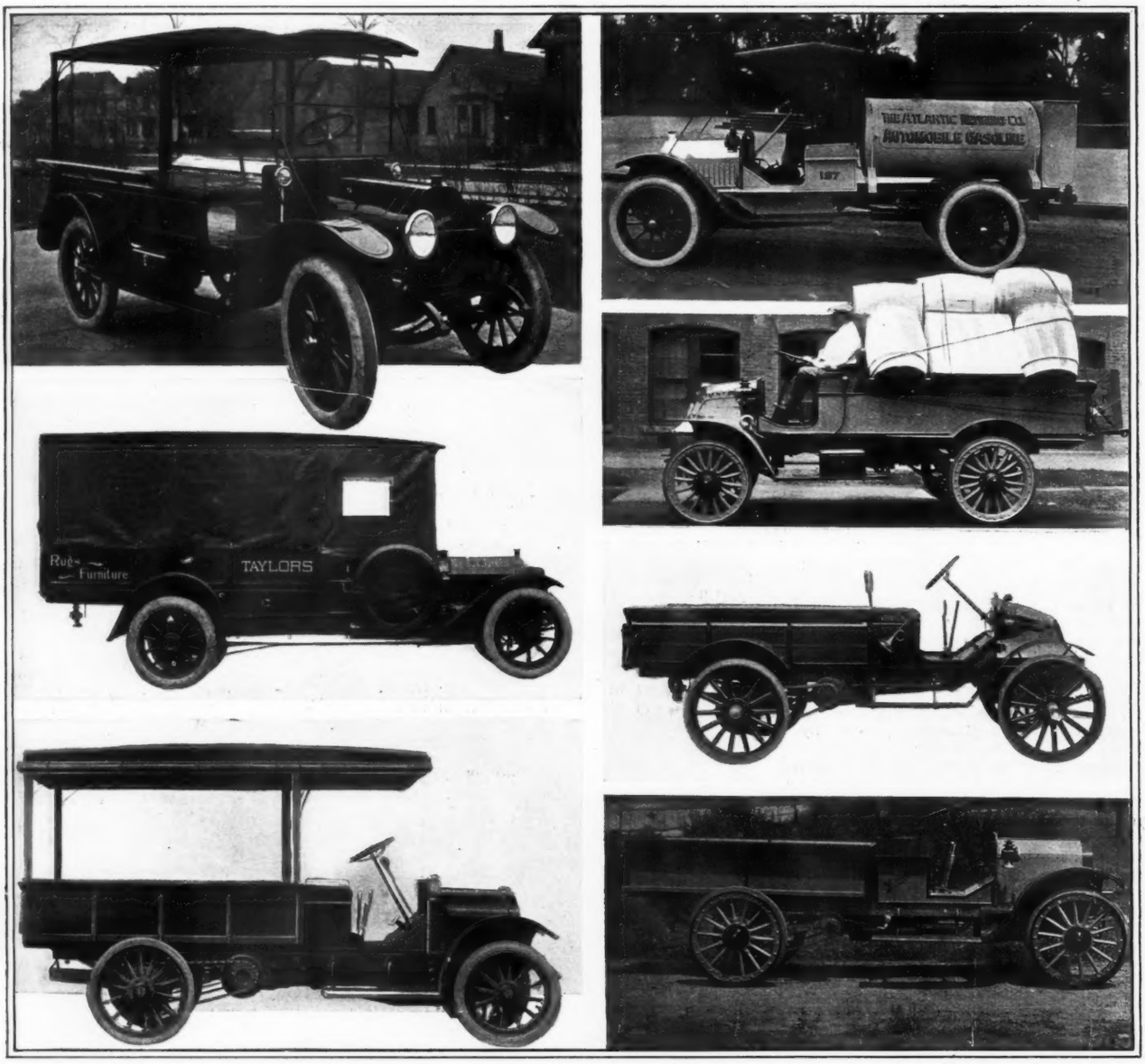
Couple-Gear

Two models of gasoline vehicles are produced by the Couple-Gear Freight Wheel Co., Grand Rapids, Mich., both of which have electric transmission. One model is a self-contained truck and the other a four-wheeled semi-tractor.

Characteristics which distinguish these vehicles are four-wheel drive, four-wheel steer, engine under the seat, electric transmission, the generator being direct-con-



Top—Side elevation of Maccar chassis. Middle—Plan view of Dain. Bottom—Plan of Commerce



Top—Studebaker delivery wagon. Middle—Marmon. Bottom—Willys-Utility

Top—White tank truck. Upper middle—Brockway truck. Lower middle—Palmer-Moore. Bottom—Dart

nected to the engine, right steer, and control by means of a street car type controller.

Each wheel is a separate unit, containing its electric transmission motor, and being mounted upon its own spindle.

Stock models are fitted with four-cylinder engines, 5¾ by 6, with cylinders cast separately. On the truck model and tractor models alike, all four wheels steer in unison, and all wheels are equipped with contracting brakes.

Crown

Replete with features of advanced construction, Crown vehicles for 1914 are entirely different from the product of 1913. Two models of 1 and 2 tons capacity, respectively, are produced, following similar lines in all but minor details.

The Crown trucks this year are of the motor under the hood type.

The two models are known as Model B, of 1 ton capacity, and Model C, of 2 tons capacity. Model B has a block motor with a bore of 4 inches and a 5-inch stroke, while the motor on Model C is 4½ by 5. The flywheel drives a four-speed selective gearset amidships.

Propulsion is through the springs on this truck, which is an unusual construction with worm drive. The steering wheel is on the left, and the lever in the center. Crown Commercial Car Company, North Milwaukee, Wis.

Dain

The Dain truck, made by the Dain Mfg. Co., Ottumwa, Ia., is new, although an experimental 3-tonner identical except in size and minor details with the 1-tonner now on the market has been on the road 3 years. It is the first recorded combination of the friction change-gear, direct drive on high gear, and final drive through worm gearing on the American market. The type of friction change-gear is also new, and is the first known practically applied friction drive having an infinite number of speeds on the reductions and direct drive on high.

The motor is carried at the extreme forward end of the chassis, the seats and floor-boards being located on either side.

Control of the vehicle is by means of the left-side steering wheel, with the spark and throttle levers thereon.

Dart

By the addition of a new model, known as Model A, the range of the 1914 Dart line embraces capacities from 750 pounds to 2 tons. The new model is a very light vehicle, designed for use in small retail work. It carries out the principles embodied in the larger models, in a small *facsimile*.

The new model is notable for its low price of $800 and its low capacity of 750 pounds. It is fitted with a four-cylinder block-cast engine, 3 5-8 by 4, driving through a cone clutch and a three-speed selective gearset to double chains.

The other two, Model B of 1 ton capacity and Model C of 2 tons capacity, follow the same lines, excepting that they are larger and heavier. Either solid or pneumatic tires are fitted to any or all models,

pneumatics being preferred. Left steer and center control is a feature in common with all models. Dart Mfg. Co., Waterloo, Ia.

DeKalb

Although at the beginning of the season but one model of De Kalb truck is being manufactured, plans have been laid for the production of a lighter type in the near future. The present model has a capacity of 2 tons.

The motor, located under the hood, drives through a three-speed gearbox and jackshaft to the wheels through open chains. Steering is on the left, with central control levers.

The motor is a Continental 4 1-8 by 5 1-4, connected with the gearset through a leather-faced cone clutch fitted with a clutch brake. The gearset is of the three-speed selective pattern and is carried amidships and rigidly attached to the gearset.—De Kalb Wagon Co., De Kalb, Ill.

M. & E. Tractor

Front-drive tractors of a novel type are being manufactured by the Merchant & Evans Co., Philadelphia, Pa. These tractors are the Devon type, which has been experimented with for some time, but not previously placed upon the market. The tractor itself consists of a two-wheeled cart, supported on its own springs. The motor is mounted under a hood forward and under the cab, the gearset and jackshaft behind the axle, and the cab above the wheels, final drive being by chains to the wheels.

The tractor acts upon and is supported by a two-wheeled trailer which is substantially a wagon without front wheels. The front of this trailer is provided with a fifth wheel, which rests over a king bolt on the frame of the tractor, beneath the driver's seat. In steering, the entire tractor turns on this pivot, the trailer naturally following the tractor.

Diamond—T

For the second year the Diamond—T Model J 1 1-2-ton worm-driven truck is placed upon the market. No changes of moment have been made in this vehicle, excepting the addition of a 144-inch option to the 127-inch standard wheelbase.

The motor is a Continental 4 1-8 by 5 1-4, fitted with a dry-disk clutch, a Brown-Lipe three-speed selective gearset, and a Timken-David Brown worm-driven axle in which the worm is carried above the wheel.

The steering wheel is on the right side, with the control levers in the center.

The Diamond—T chain-driven models are 3 and 5-tonners, respectively, being characterized by their under-the-hood motor location, disk-in-oil clutches, three-speed selective gearsets, and exposed chain drive. A 4 1-2 by 5 1-2 motor is used on the 3-tonner and a 5 by 5 1-2 on the 5-tonner.—Diamond—T Motor Car Co., Chicago, Ill.

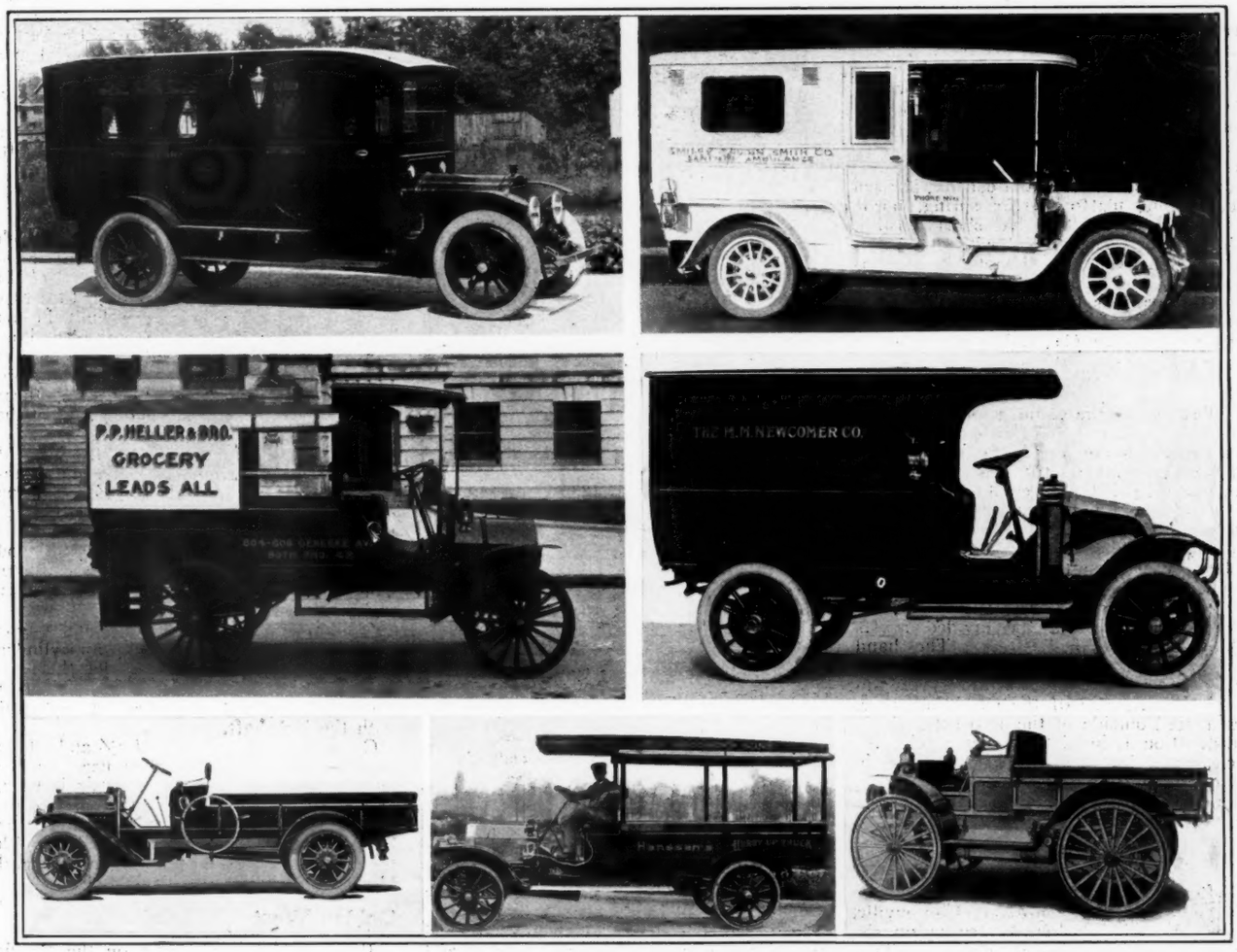
Dispatch

Marked improvements have been made in the Dispatch vehicle for 1914. This truck is built in Minneapolis, Minn., by the Dispatch Motor Car Co. It is made in one chassis model for 1914, of 1,000 pounds capacity instead of the motor buggy type of vehicle produced previously; the new truck is provided with a 3¾ by 5, four-cylinder water-cooled engine, located under a forward hood and driving through a shaft to a combined clutch, gearset, differential and jackshaft in the middle of the car, from which the drive is taken by double chains inclosed in metal housings. The truck has been made considerably lighter, and because of this ball bearings have been substituted for the roller type used in the wheels on previous models.

Dorris

Enlarged by the addition of a new 3-ton model, the Dorris line of commercial vehicles comprises three models ranging in capacity from 1,500 pounds to 3 tons.

All models carry out the same principles of design. The power plant which is used in all models is the Dorris 4.375 by 5 motor, dry-disk clutch and gearset, assembled in a unit, and driving to the live rear axle through a shaft and bevel gears. The most



Top—White invalid car. Middle—Chase delivery wagon. Bottom—Buick light truck

Top—White ambulance. Middle—Lippard-Stewart delivery wagon. Bottom—Modern light wagon

International truck model MA

remarkable feature of the line is the uniformity of design in such a difference of sizes as that between the 3-4-tonner and the 3-tonner.

Dorris trucks are sold as chassis only, bodies being furnished solely on special designs.—Dorris Motor Car Co., St. Louis.

Duryea

Formerly manufactured by the Brooks Co. under a license from the Duryea company, Duryea delivery cars are this year put out by the Duryea Motor Co., Saginaw, Mich. They are built in two models of 800 and 1,000 pounds capacity.

In general make-up the trucks follow the design of the Duryea Buggyaut. The motor is a two-cylinder, two-cycle, air-cooled type, the two cylinders being set horizontal and side by side.

The crankshaft of the engine is the only shaft in the transmission system, and drives directly to the wheels through grooved rollers at its ends which engage grooved sheaves on the wheels. The entire power plant is suspended on a sub-frame attached to the rear axle at its rear and hinged to the floor of the vehicle in front. The power plant is shifted forward and back to give forward and reverse speeds, while the rollers at the ends of the shafts are slid in or out to give low or high speeds.

Fargo

Designed to take the place of the ordinary horse and wagon with the least disarrangement of existing conditions, the Fargo 1,500-pound truck embodies a number of unusual features. It is produced on a moderate scale for use in its locality. Features which are especially worthy of note are its friction drive to a driveshaft located on one side of the chassis, final drive being through bevel gears to the live rear axle, its left steer and control, pressed steel frame, platform rear spring, bottle necked in front to give short turning.

This vehicle is provided with a two-cylinder horizontal opposed motor, the cylinders being located longitudinally. The flywheel is used as the friction disk, and is provided with an 8-inch thrust bearing.—Fargo Motor Car Co., Chicago.

Federal

Substantially the same 3,000-pounder as formerly produced is offered for 1914 by the Federal Motor Truck Co., Detroit. To be numbered among the standard faction, the Federal policy is to employ nothing but standard construction, and to concentrate on one model. Its 1 1-2-tonner is designed for light trucking, and has been applied to a large variety of trades.

The engine is a Continental 4 1-8 by 5 1-4. The jackshaft is of the three-quarters floating pattern, the divided shafts taking only torsional stress. The hand brakes are expanding ones, located in the rear wheels, and the foot brakes are on the jackshaft, also of the expanding type, and placed outside of the sprockets. This construction reduces the tread of the vehicle, and brings the sprocket pull directly upon the bearings, instead of at a pry. The frame is of pressed steel with the front spring horns integral.

Four-Wheel-Drive

After several years of manufacture, the Four-Wheel-Drive Auto Co., Clintonville, Wis., is again placing its trucks on the market without radical change. Two models of 1 1-2 tons and 3 tons, as formerly, are produced, each of which is characterized by its four-wheel drive, even distribution of load between the axles by placing the cab above the motor, shaft drive through bevel gears to floating axles front and rear, and the use of single tires of the same size on all four wheels.

The two models are practically identical except for minor differences in detail and the strength of parts directly affected by the load carried. The drive is transmitted to all four wheels by using floating axles front and rear, driven by shafts terminating in a common gearbox.

From top to bottom:
1—Lauth-Juergens transfer bus
2—Adams 1-ton truck with top
3—Monitor with express body
4—Stegeman 1-ton type truck
5—Diamond T with stake body
6—Lange in express design

Garford

Continued practically without change the Garford line of five models ranges in capacity from 2 tons to 6 tons. Garford trucks are largely manufactured in the Garford shops, and are not produced in yearly models, but in continuous series. They are characterized by several features of design. Foremost among these is the location of the motor and the construction of the driver's cab. The motor is between the seats and inclosed under a hood, with the radiator in front. The cab is placed directly over the motor, but instead of being raised, as in the usual American type of construction, it is set directly upon the frame, affording the driver an equally low driving position as in the European type.

The drive from the motor is in a straight line to the combined gearset and jackshaft, which affords four forward speeds.

Right steer and center control is used on all models. Two wheelbase options are offered on each model, and these two options apply to all, 128 and 150 inches, respectively.—Garford & Co., Elyria, O.

Gay

Although Gay commercial vehicles, product of S. G. Gay Co., Ottawa, Ill., appeared in one model late in 1913, another has been added for 1914. These two chassis are almost replicas excepting the strength of parts directly affected by the difference in load capacity. Model F, which is continued without change, has a capacity of 1 ton and Model G of 1 1-2 tons. They follow standard lines in design of component parts.

The motor is 3 3-4 by 5 1-2, located under the hood. The wheel is to the left, with the levers in the center.

G. M. C.

One of the few makers who produce both American and European types of commercial vehicles is the G. M. C. Built in four capacities, ranging from 1¼ tons to 5 tons, G. M. C. vehicles are built in six models, four of which have their motors under the hood and two of which have the motor under the seat. Formerly manufactured by two other companies, these vehicles are all made under one roof at the present time.

They are characterized by the use of chain drive on all models. The motor under-the-seat type is made in 3½ and 5-ton capacities, both models of which are practically identical, except as to strength. Four models are made in the under-the-hood type, of 1¼, 2, 3½ and 5 tons capacity. The two smaller models are almost replicas, and the larger two are similar.

On Model H and K, of 3½ and 5-tons burden, the motor is a 5 by 5 four-cylinder type, cast in pairs, located under the seat. It drives through a disk-in-oil clutch to a three-speed progressive gearset, integral with the jackshaft.

On Model HU and KU, of 3½ and 5-tons capacity, the same motor as used on the models referred to just previously is used, as well as the same clutch and gearsets, but it differs in that the motor is under the hood and that steering is to the left, with the control levers in the center.—General Motors Truck Co., Pontiac, Mich.

Golden West

Because conditions differ on the Pacific Coast from those in the east and central part of the country, where the majority of commercial vehicles are built, the Golden

West Motors Co., Sacramento, Cal., has entered the field with a design especially intended for California service. This truck is to be four-wheel-driven and steered. It is provided with a standard Continental motor mounted together with the gearset on a separate sub-frame, supported from the main frame on springs, so as to render it independent of road shocks or vibration. The gearset is of a novel type, the gears being separated, and instead of meshing with one another, are connected by Whitney silent chains. From the lay shaft which takes the drive, shafts extend forward and back to Sheldon worm-driven axles, fitted with especially designed universal joints with a maximum deflection capacity of 35 degrees. The experimental model of 2 tons capacity is now undergoing road tests.

Gramm

Canadian Gramm trucks are made in three capacities—1, 2, and 3½ tons—and are designed especially for use in the Canadian provinces, where, being Canadian built, they may be obtained without the payment of import duty. The 1-tonner is a continuation without change from last year's production, while the 2 and 3 1-2-ton models have been somewhat changed from their former designs.

The 1-ton truck differs from the larger models in that its motor is inclosed in a hood forward, while in the 2 and 3 1-2-tonners the hood is between the seats. The steering wheel is to the left in this model, with the levers in the center. The motor is 3¾ by 5¼ instead of 4½ by 5½, as on the larger.

The 2 and 3½-ton vehicles are practically identical, except as to principal dimensions, and the strength of load-supporting parts. The motor is located between the seats and under the floor, at the extreme front of the chassis, but back of the front axle.—Gramm Motor Truck Co., Waterville, Ont.

B. A. Gramm

Amplification of the line of B. A. Gramm trucks produced by Gramm-Bernstein Co., Lima, O., has been accomplished for 1914, the 2 and 3½-tonners of last year being continued, with the addition of a new 1-tonner and a 5-tonner, each of which departs somewhat from previous B. A. Gramm practice.

The B. A. Gramm truck is characterized most prominently by its use of an electric starting and lighting system, and the use of the constant-mesh individual-clutch type of gearset. The vehicles are all chain driven and employ pressed steel frames.

The complete line consists of a 1-tonner, a 2-tonner, a 3½-tonner, and a 5-tonner.

The 1-tonner has its Continental 3¾ by 5¼ motor under a hood forward and the driver's seat to the left, with central control levers.

Such general points as have been decided in regard to the 5-ton model include European engine location, a 4⅛ by 5¼ engine, electric lighting and starting. Individual clutch gearset, jackshaft foot brakes, and chain drive. It will be modelled on the lines of the 1-toner. Left steer and center control will be a feature in common.

G. V.—Mercedes

Placed upon the market during the summer of 1913 the Mercedes motor truck, which is being manufactured in America by the General Vehicle Co., Long Island City, N. Y., is built in a single chassis model of 6-tons capacity.

The G. V.-Mercedes is an exact duplicate of the German truck and is characterized by its European construction, the motor being set high in the frame under a hood set entirely behind the front axle with the driver's cab to the rear. It employs a flexible steel frame and shaft drive through an internal gear rear axle. The vehicle has steel wheels with right steer and control.

The Mercedes motor has a bore and stroke of 4 1-4 by 5 7-8.

The rear axle is a solid straight forging, its sole duty being the support of the wheels of an A-shaped torque member built up of pressed steel channel members. The apex of this A consists of two bearings at the forward end which are anchored on a cross member of the frame disposed immediately abaft of the gearset and in line with the front and only universal of the drive shaft. The cross member of this torque arm forming the connection of the legs of the A is a substantial pressed steel channel through which passes the drive shaft. Between it and the axle to which it is parallel is the jackshaft which is built up of cast members. The jackshaft drives through spur pinions to internal teeth on the brake drums which are of exceptional size.

From top to bottom:
1—Kelly 1-ton delivery car
2—Lambert open express type
3—Star with stake type body
4—Horner truck with open body
5—Republic with stake body
6—Chase in heavy express
7—Jeffery 2,000-pound wagon

Hexter

When first announced in 1903 the Hexter truck, made by Roland Gas-Electric Vehicle Co., New York City, was in one chain-driven model of 3 1-2 tons. For 1914, this model has been altered and now has worm drive to the rear axle, a single motor and differential being employed. Two other models have been added, one of 1 1-2 tons capacity, also worm-driven, and one of 7 tons capacity, chain driven. The 7-tonner, except in weight, size and capacity, is very similar to the first 3 1-2-tonner.

The feature of the Hexter truck is its electric transmission of power. It follows standard lines otherwise, with the exception of the worm drive. The trucks use ordinary gasoline engines, which instead of driving through clutches and gears, drive through electric generators, whose current output is conducted directly to a motor or motors which drive the vehicle.

Horner

Formerly the Grabowsky, the Horner truck is a refinement of former design, built by a new organization, in a new factory. It is built in five capacities, from 1 to 5 tons. The Horner company has undertaken the maintenance of the Grabowsky vehicles, and will continue the improved models in a series, improving them from time to time without reference to year or time of year. The business of the Horner company started in January, 1913, at which time the Grabowsky Power Wagon Co. had been dissolved.

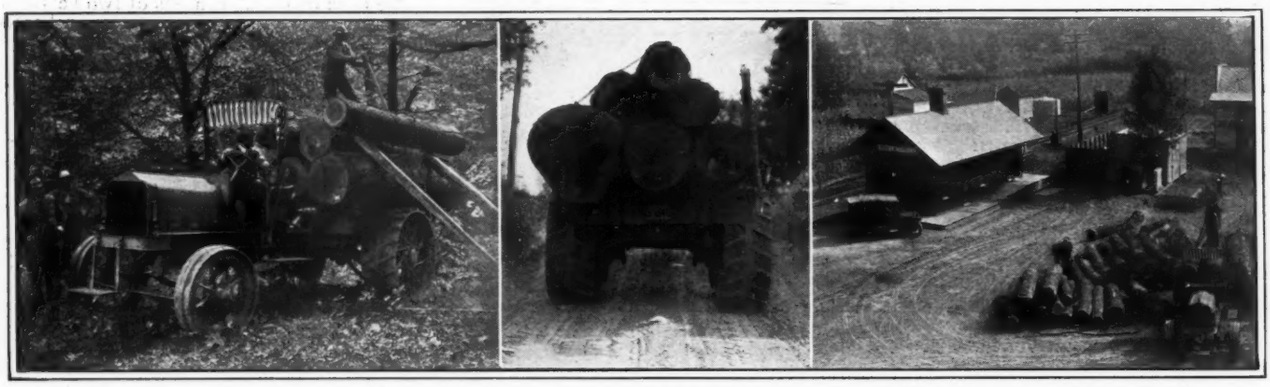
The Horner truck is characterized by the use of the French type of hood with the radiator on the dash, by its use of left steer and center control, chain drive, uniform wheel diameter front and rear and rear wheel brakes.

The complete line consists of a 1-ton, 1½-ton, 2-ton, 3-ton, and 5-ton, all patterned alike, except as to size and load capacity. Improvements over the Grabowsky models consist of the elimination of the two-cylinder models entirely, standard Continental four-cylinder power plant being employed instead, the dropping of the detachable engine feature, the changing of the hood form to give better appearance, and the lowering of the radiator. Left steer and center control are innovations in this line.

The motors used are 4⅛ by 5¼ on the first three models, 4½ by 5½ on the 3-tonner, and 5¼ by 5¾ on the 5-ton job.—Detroit-Wyandotte Motor Co., Wyandotte, Mich.

Hupmobile

Introduced a year ago, but only conservatively pushed, the Hupmobile light delivery car is produced for 1914 with practically no changes. Its chassis differs only slightly from the 32 touring car produced by this company, as it is primarily intended for fast delivery. It has a capacity of 800 pounds, and a loading space 52½ inches



White trucks in lumber work. At left—Loading logs. Center—Taking them to the railway station. Right—Leaving them for shipping

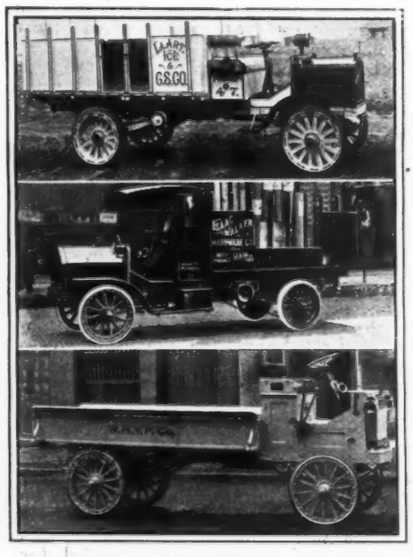
long by 40½ inches wide. The Hupmobile is regularly equipped with a standard light-weight body especially designed for package work, but the chassis unequipped, ready to receive any type of special body, will also be sold. The features of this vehicle are a block motor and unit power plant with four cylinders 3¼ by 5½, with a gasoline tank on the permanent shroud dash, shaft drive, center control and left steer; and an exceptionally low floor and center of gravity. The only improvement that has been made is the addition of the Pierce Speed Controller as regular equipment.

The Pierce speed controller consists of a speedometer which instead of being mounted on the dash is on the intake manifold, and instead of indicating the speed acts directly upon the engine through a butterfly in the intake pipe. It is set and sealed when the truck is delivered, and prevents overspeeding the truck, being nevertheless unaffected by the speed of the motor in low gear or in idling, as it is driven from the front wheel and not from the engine itself. This controller is set for a maximum speed of 20 miles per hour.—Hup Motor Car Co., Detroit, Mich.

Geneva

Two Geneva models of 1,000 and 1,200 pounds capacity, equipped with open and closed bodies, respectively, are continued for 1914. The only change that has been made is in the substitution of thermo-syphon cooling for the pump formerly employed. This has necessitated no change whatever in the radiator or engine, but simply affected the water connections.

The Geneva vehicles are built upon a single chassis. The motor is located in a low hood in front of the front axle, with the radiator behind it, occupying the usual place for the dash. The engine is a two-cylinder horizontal opposed type, 5 1-8 by 4 1-2, and drives through a planetary gearset to the jackshaft, from which the drive is transmitted by double chains.—Geneva Wagon Co., Geneva, N. Y.



Top—Model B Wichita 2-tonner. Middle—2-ton Avery. Bottom—Sanford model L, 1½ ton

Indiana

As previously, the Indiana trucks will be continued another year without radical changes or additions. They range in capacity from 1 to 3 tons and are produced in three models, following the same general lines in design. The Harwood-Barley company is an adherent to the European form of structure, the motor being inclosed under a bonnet forward of the driver's compartment. Its construction is conventional throughout, final drive being by chains. and the frame being built up of structural channel steel.

The complete 1914 line consists of 1-ton, 2-ton, and 3-ton vehicles each of which is practically identical except as to details directly affecting the live load capacity.—Harwood-Barley Mfg. Co., Marion, Ind.

Jeffery

By the addition of the new four-wheel-driven model and Jeffery line of trucks, made by the Thomas B. Jeffery Co., Kenosha, Wis., first introduced a year ago, is increased to three in number. They range in capacity from 3-4 ton to 1 1-2 tons.

The 1,500-pound light delivery truck follows the lines of the passage vehicles quite closely, as it is intended to be mounted on pneumatics for fast delivery, meeting conditions quite similar to those encountered by passenger cars. The 1-ton is chain driven, and is mounted on a truck frame, while the new 1 1-2-ton is a radical departure not only from passenger vehicle practice, but from previous truck practice as well. Its salient features are: Four-wheel-drive by means of double-reduction internal gears, four-wheel steer, four-wheel-brakes, unsymmetric mounting of the power plant, a novel engine inclosure with reference to the driver's cab, left steer and center control, unusual wheels, and many other smaller points of originality.

Within the brake drum of each wheel, teeth are cut. Engaging these teeth are spur pinions supported by the brake drum cover, and through universals, connected with a jackshaft on each axle. The differentials and driving gears of these jackshafts are mounted to the left side of the axle, and driven by a longitudinal driveshaft, which extends forward or back, as the case may be, to a common gearset, located in the exact center of the chassis. The driveshafts are connected to the countershaft of the gearset, which is of the four-speed selective pattern, while the clutch shaft drives the mainshaft of the gearset.

I-H-C

Continuing its two models of 1,000-pound commercial vehicles, the International Harvester Co., whose motor truck factory is in Akron, O., announces no changes other than minor refinements. These trucks are styled Model MA and MW., signifying, respectively air cooling and water cooling. Both follow the same design other than the method of cooling. Their engines are under the body, and are of the horizontal two-cylinder opposed type. They drive through a disk clutch to a unique type of gearset affording two speeds forward. The gears are constantly in mesh, and the different speeds are obtained by means of pawls which engage free gears on the main shaft. Final drive is by double chains. A number of standard bodies are fitted to I-H-C chassis.

Lambert

Trucks ranging in capacity from 800 pounds to 2-tons are built by the Buckeye Mfg. Co., Anderson, Ind. Noteworthy characteristics of these vehicles are their double chain drives from friction change gears, the position of their motors under forward hoods, and right steer and control.

The complete 1914 line consists of five models, of 800 pounds, 1,500 pounds, 2,000 pounds, 3,000 pounds and 4,000 pounds. The first of these two are equipped with 3½ by 4¼ motors; the third, 4 1-16 by 4½, and the larger two with 4½ by 5 sizes. The wheelbase of the 800-pound model is 106 inches, and the 1,500-pound model 114 inches, while on the 1-ton, 1½-ton and 2-ton models it is 120.

Lange

For light trucking service two models of commercial vehicles substantially identical in design are produced by the Lange Motor Truck Co., Pittsburgh, Pa. These models are conservative in design, having their motors under the hood forward and double chain final drive. They employ standard Continental motors, individual clutch gearsets, left drive and central control and thermo-syphon water circulation.

A new special model is being prepared

for the market, but up to the present time no details have been disclosed. The only change that has been made in Lange trucks during the past year is the substitution of the Connecticut magneto for the make formerly used.

The 1-ton truck has a 4-cylinder block motor, 3¾ by 5 ¼, which drives through a Hele-Shaw disk-in-oil clutch through the three-speed selective individual one-clutch gearset, which is mounted integral with the jackshaft to the rear wheels through double chains.

The 2-ton truck is identical with the lighter model excepting that its motor is 4⅛ by 5¼, that it is, of course, heavier and larger, and that its wheelbase is 136 inches instead of 125 inches, as on the 1-ton type of vehicle.

Lauth-Juergens

Continued practically without any change, Lauth-Juergens trucks, made by the Lauth-Juergens Motor Car Co., Fremont, O., are placed on the 1914 market in four sizes adapted to all sorts of trucking. The basic principles of design that have always characterized this line of vehicles are still found intact. The motor is placed under the floor and drive is through a clutch and sliding gearset to a jackshaft, and thence to the wheels by double chains. The steering wheel is to the right, with the levers at the side.

The Rutenber motors, with which all models are equipped, drive through a three-plate dry-disk clutch, to selective sliding gearset, mounted integral with the jackshaft. On the 1 and 2-ton models three speed gearsets are provided, while on the 3 and 5-tonners four-speed gearsets are employed.

Lewis

Two models of Lewis trucks, manufactured in 1913, are continued for 1914. The regular models consist of a 2½ and 5-ton, the first being of the European type and the second of the American type. The special model is an adaptation of the 2½-ton model in which the driver's cab is placed over the motor instead of behind it, increasing the load platform length by about 3 feet and increasing the load capacity to 3 tons. The 2½-ton truck has a 4¼ by 5-inch motor, and the 5-tonner 4¾ by 5½ size. They are otherwise similar, both having right steer and control, Hele-Shaw multiple-disk clutch, three-speed constant mesh individual clutch gearsets integral with the jackshafts, driving through double chains to the rear wheels.—Lewis Motor Truck Co., San Francisco, Cal.

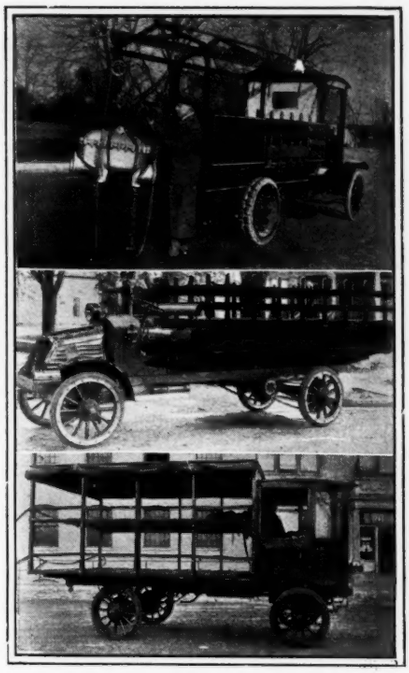
Lippard-Stewart

Addition to the Lippard-Stewart line in the form of a 1½-ton worm-driven truck was made in the Fall of 1913. This model is to be considered a 1914 model. Besides this addition to the line, the 1,500-pound model is continued with practically no changes except that an option at extra cost of a worm-driven axle is offered.

Lippard-Stewart trucks are of the European type, the motors being under a French type hood forward of the dash, with the radiator mounted on the dash. Left steer and center control are used on all models.

On the ¾-tonner the motor is 3¾ by 5¼, and drives through the clutch and gearset to the rear axle through a driveshaft having two universal joints. The rear axle is of the floating pattern equipped with 35 by 4½ pneumatic tires all around, with option of worm-drive and 34 to 3½ front and 34 by 4 rear solid tires. The wheelbase of this model is 115 inches or 125 inches on option.

The 1½-ton model employs a 4⅛ by 5¼ motor driving from the gearset to the rear axle through a divided propeller shaft. The middle of this shaft is supported by a cross member through a self-aligning bearing, a third universal being located at this point. This is to eliminate the excessive length of free shafting that would otherwise result with the long wheelbase used. The limited length of free shafting back of the intermediate propeller shaft support is so short as to eliminate the whip that would otherwise be present. The tires are 36 by 3½ in front and 36 by 3 dual in the rear, solid tires being standard. As in the smaller type the hand brakes are internal expanding in the rear wheels, the service brakes contracting on the same drums. Option wheelbases of 145 inches and 158 inches are offered.—Lippard-Stewart Motor Car Co., Buffalo, N. Y.



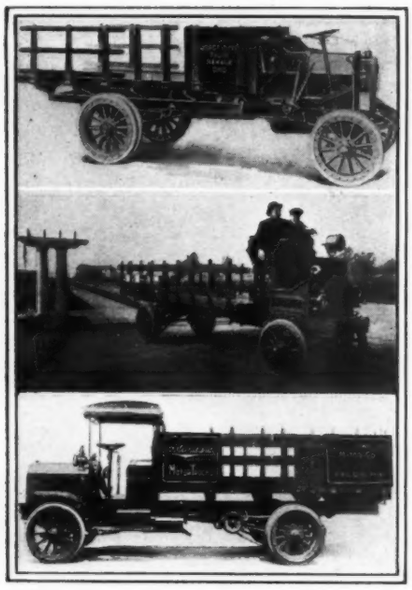
Top—Federal handling water meters. Middle—Krebs with stake body. Bottom—Wilcox 2-ton truck

Little Giant

Two models of Little Giant commercial vehicles are continued for 1914, one of 1-ton and the other of 1½-ton capacity. These models are of two cylinders and four cylinders respectively, and for 1914 all models have selective sliding gearsets, the planetary gearset having been abandoned. Both types of vehicles are similar in design, having their motors under the floor, chain drive, solid tires and pressed steel frames.

Model F, of 1-ton capacity, has a two-cylinder motor, 5 by 4 inches, with cylin-

Peerless trucks of 5 tons capacity used with trailers in excavating work



Top—Blair truck of 5,000 to 7,000 pounds capacity. Middle—Lewis model 21S of 2½ ton capacity. Bottom—Standard 3-ton truck

ders laid crosswire on the frame, and opposed. The gearset is incorporated with the jackshaft. The steering wheel is upon the right, with the levers at the side. Model H, of 1½-ton capacity, has a four-cylinder motor, 3¾ by 4 ½, driving through a shaft to the gearset. Its steering wheel is to the left and the levers are in the center.—Chicago Pneumatic Tool Co., Chicago, Ill.

Locomobile

Continuing a single model of 5-tons capacity, the Locomobile company, Bridgeport, Conn., enters the 1914 market having foresworn none of its past practices. Very few changes have been made. It continues the use of a pressed steel frame; bronze castings instead of cast steel; cast iron, or aluminum, in the motor base; differential case and gearbox; steel wheels; chain drive, chains being inclosed; right steer and control and a differential lock.

For 1914 the control of the differential lock will no longer be placed in the driver's compartment as it formerly was in some cases. An interesting improvement on the ignition system consists of a fixed spark double system, in which the magneto circuit and the battery circuit are independent, operating on different spark plugs. Accessibility of parts is a feature of Locomobile vehicles. The main bearings of the engine may be renewed without disturbing the load or the rest of the engine or the clutch. In fact the whole crankshaft, together with its connecting rods and pistons, can be taken out bodily by simply dropping the lower portion of the engine base. The clutch may similarly be dropped without disturbing the engine or gearset and the change-gear or differential may be removed without disturbing any portions of the chassis.

Longest

Three models of Longest motor trucks are continued from the 1913 line by the Longest Bros. Co., Louisville, Ky. All models with the exception of a special coal truck are of the European type with the motor under a hood forward and equipped with right steer and control. The coal truck, which is provided with a four unit compartment dumping body, has its motor under a hood between the seats of the cab. All models are similar in the use of 5 by 5½-inch motors, driving through leather-faced clutches and four-speed selective gearsets integral with the jackshafts from which the final drive is taken by double chains.

Luck Utility

Interesting chiefly because of the location of its factory in the southwest, the Luck Utility truck presents advanced construction in several particulars. The motor is located under a hood which is between the seats, with the gearset a unit with it, and drives through a shaft to a bevel-driven rear axle. The vehicle is fitted with a pressed steel frame with three-quarters elliptic springs in the rear and half-elliptics in front. It is made in one chassis model, and is intended for light delivery work, having a maximum capacity of 1,000 pounds.—Cleburne Motor Car Co., Cleburne, Tex.

Kearns

Successors to the Kearns Motor Car Co., the Kearns Motor Truck Co., Beavertown, Pa., is continuing the single chassis 1,500-pound Kearns truck practically without change for 1914. The new company has abolished its selling branches, and instead sells its product direct to the user. The principles back of its design are simplicity and fool-proofness. Accordingly it has a friction drive from a four-cylinder 3¾ by 4 motor located under the hood forward, final drive being by chains. The truck employs high wood wheels with solid tires and right steer and control. It is equipped with a variety of different body styles, and will be provided with special bodies upon order.

Kelly

Expansion of its line to cover a greater range of applications is the most noteworthy development in the activities of the Kelly-Springfield Motor Truck Co., Springfield, O. In addition to its 1 and 3-ton models a 2-ton and a 5-ton model have been added, following the same lines as the other models, the former 3-ton model having been increased in capacity to 3½ tons.

The complete line for 1914 consists of Model K-30, 1-ton; K-35, 2-ton; K-40, 3½-ton, and K-50, 5-ton.

On the revised Model K-40 a wheelbase option of 208 inches has been offered in addition to the 150 and 172-inch options of 1913. In order to lower the load platform of the 3½-tonner, permitting the use of a 4-inch bolster instead of the 9-inch size previously necessitated, the rear tire sizes have been reduced from 42 by 5 dual to 38 by 5 dual. On the 1-ton and 2-ton model wheelbase options of 120 or 144 inches are offered, and on the 3½ and 5-tonner the options are 150, 172 and 208 inches.

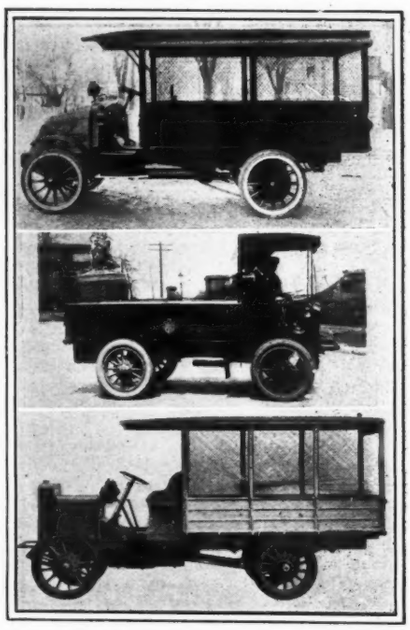
King

Concentration upon one model is the policy of the A. R. King Mfg. Co., Kingston, N. Y., whose 3½-tonner is continued for 1914 with practically no changes of moment. In general principles, it follows the American form of construction, the motor being located beneath the floorboards. It is provided with chain drive and right steer with center control.

Refinements for 1914 consist in an increase in weight of both axles, bronze bushings in the motor, larger tires, the front and dual rear tires being the same size, 36 by 5, the elimination of grease cups in exposed places, such as on spring bolts, self-lubricating magazine bearings being substituted therefor, heavier jackshaft, an increase in the size of the front sprocket to 17 teeth, and minor refinements in the control connections of the clutch and gearset.

Kisselkar

Six models comprise the line of Kisselkar trucks for 1914. These have been somewhat changed from those of 1913, their capacities having been readjusted. Formerly the line consisted of 1,500-pound, 1-ton, 2-ton, 3-ton, 4-ton, and 5-ton models. In the new line the capacities have been adjusted to the actual needs of ordinary business, as the Kissel company has found them, instead of in even tons. The result is the continuation of the 1,500-pounder



Top—Krebs 1½-ton. Middle—Autocar 1½-ton. Bottom—Mais, 1½-ton

and the 1-tonner, and the substitution of a 1½-ton for the 2-tonner; a 2½-ton for the 3-tonner, a 3½-ton for the 4-tonner, and a 6-ton for the 5-tonner. Each of the models which have new capacities have been redesigned, and are to be considered new models, although they follow the same lines as their predecessors, excepting the strength of load-carrying portions.

All Kisselkar trucks follow the same lines in design with the exception of the 1,500-pounder, which has shaft drive. There are two motors in use, that on all models up to and including the 2½-tonner being 4½ by 5¼, and that in the two larger models 4⅞ by 5. On the 1,500-pounder the turning radius is 22 feet with a 125-foot wheelbase. On the 1-tonner it is 24 feet with a 140-inch wheelbase. On the 1½-tonner it is 25 feet with a 132-inch wheelbase. On the 2½-tonner, 25 feet with a 144-inch wheelbase. On the 3½-tonner, 26 feet with a 162-inch wheelbase. On the 6-tonner the turning radius is 26 feet and the wheelbase 168 inches.—Kissel Motor Car Co., Hartford, Wis.

Knox

In the past the Knox has done a great deal of specializing on motor fire and civic

equipment, and for this purpose it manufactured a great variety of chassis in capacities from 1 to 5 tons. The development of the Martin tractor, however, has convinced the Knox company that much of this work can be more economically carried on with tractors attached to the old horse equipment, such as fire engines, ladder trucks, etc., and as a result, for 1914, but two capacities of trucks will be built, of 2 and 3 tons capacity, all loads greater than 3 tons being assigned to tractor and trailer equipment, which as yet has not been found as economical for light loads as a self-contained truck, but more so for heavier loads.

The Knox-Martin tractor has its motor under a hood, part of which is forward of the dash, and part of which protrudes into the cab. The motor is the Knox valve-in-the-head type, and drives through a dry-disk clutch and three-speed selective gearset to a jackshaft and chains to the rear wheels. It is built upon a rolled channel frame, and has right steer and control.

The complete 1914 line consists of Model R-3, 2-ton truck; M-3, 3-ton truck; Model 31, 10-ton tractor, and Model 32, 20-ton tractor. All of the other models carried in 1913 have been dropped except as special productions.—Knox Automobile Co., Springfield, Mass.

Koehler

Marked changes have been made in the Koehler vehicle for 1914. While in general mechanical make-up the truck is substantially the same as offered a year ago, much of the motor buggy look has been cast off. Formerly 36-inch front wheels and 48-inch rear wheels were employed; but this season the wheels will both be 36 inches high, and will carry the same 2½-inch tires.

The same power plant is employed as previously, having a two-cylinder opposed engine under the body, driving by a shaft and bevel gears to the jackshaft and thence by double chains to the rear wheels. The jackshaft is of a novel type, being a cylindrical housing of uniform diameter, within which is mounted the differential driving gears, and the planetary gearset. Left steer and center control are used, the radiator being mounted in place of the dash. The load capacity of the Koehler has been raised from 1,600 pounds to 1 ton.—H. J. Koehler Sporting Goods Co., New York City.

Krebs

Amplification of the Krebs line has been effected by the addition of a new model, smaller than the previous types, and differing from them in that it employs shaft drive instead of chain drive.

For 1914 the four-cycle Continental engine has entirely supplanted the two-cycle engine, being formerly optional equipment.

Krebs models range from 1,000 pounds to 1½ tons capacity, and are five in number, comprising four separate capacities. The new model, designated Model E, is of ½-ton capacity, and greatly resembles Model BB, of ¾-ton burden, among the continued models.

Model E has a four-cylinder Continental motor 3½ by 4. Steer and control, respectively, as in all other Krebs models, are on the left and in the center.

Model BB differs from the new model in that its motor is 3¾ by 4½, and that instead of the centrifugal pump circulation used in the smaller type, thermosyphon cooling is used.

Model AA has a capacity of 1 ton, and is similar to Model BB excepting its final drive, which is through side chains.

Model D, of 1½ tons capacity, has a 3¾ by 5¼ engine, and differs from the other types in that its hood is fitted with louvres and the hand brakes, instead of being on the rear wheels, are on the jackshaft, service brakes acting on the wheels. Model DD is like Model D, except that it has a 144-inch wheelbase instead of 118 inches.—Krebs Commercial Car Co., Clyde, O.

Maccarr

Addition of a 2-ton model constitutes the feature of the 1914 announcement of the Maccar Co., Allentown, Pa. The 1,500-pound, 1-ton, and 1½-ton trucks are continued practically without change. The Maccar vehicle is made in capacities ranging from 1,500 pounds to 2 tons and is intended for delivery purposes and the service of small tradesmen principally. Features in common with all models are motors under the hood, left steer, center control, pressed steel frames, and platform spring suspension in the rear. The new model is practically an enlarged duplicate of the 1½-ton truck.

With the exception of the 1,500-pound model all Maccars are similar in the following features: The motor is a 4-cylinder block type, 3¾ by 5¼, incorporated with the inclosed flywheel and gearset to form a unit power plant. Liberal wheelbase options are given on all chassis, three lengths being optional on each, namely, 126 inches, 138 inches or 150 inches.

The 1,500-pound vehicle differs from the larger type in that final drive is through a bevel driven rear axle; standard tire equipment is pneumatic; all brakes are on the rear wheels, and but two wheelbase options are offered, namely, 120 or 132 inches.

Mack and Saurer

International Motor Co., New York, still has on the market its comprehensive line of Mack trucks in 1, 1 1-2, 2, 3, 5 and 7 1-2-ton sizes. These are all chain-driven from jackshafts, while the capacities from 3 to 7 tons are furnished either with the motor under a forward bonnet or under the seat. Those below 3 tons have the motor under the hood only. In design, the International company is acting conservatively, and is therefore making no announcement of any changes in construction at this time. In additon to the Macks, this concern markets Saurer trucks in 5 and 6 1-2-ton capacities. These have front hoods and chain drive.

Mais

Six models of Mais commercial vehicles, made by Mais Motor Truck Co., Indianapolis, will be built for 1914, all of which are continuations practically without change from the product of 1913, except for certain improvements in material.

The Mais truck is of the European type, and characterized by the unique design of its hood, the radiator being higher than the rest of the hood and backed up by a short air suction chamber with exhaust openings at the sides. All Mais models, though they range in capacities from 1 1-2 tons to 3 tons, are provided with the same motor. This motor is incorporated with the inclosed flywheel and gearset to form a rigid unit power plant.

The complete line consists of two 1 1-2-ton models, two 2-ton models, a 2 1-2-ton model, and a 3-tonner. The difference between the 1 1-2 ton models is in their wheelbases, which is also the principal difference between the two 2-ton models.

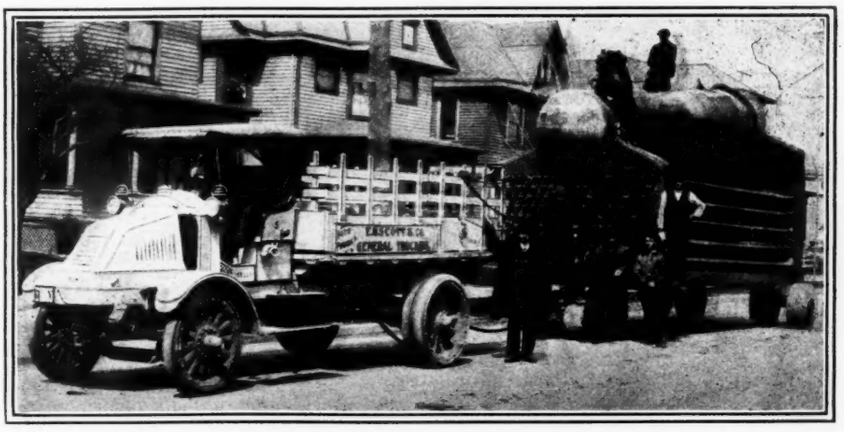
Marmon

Light delivery vehicles, built upon adapted passenger car chassis, are again placed upon the commercial vehicle market by the Nordyke & Marmon Co., Indianapolis. The motor is a slow speed, long-stroke type and well adapted to heavy duty on account of its large valves placed on opposite sides. The waterjackets are said to be unusually large.

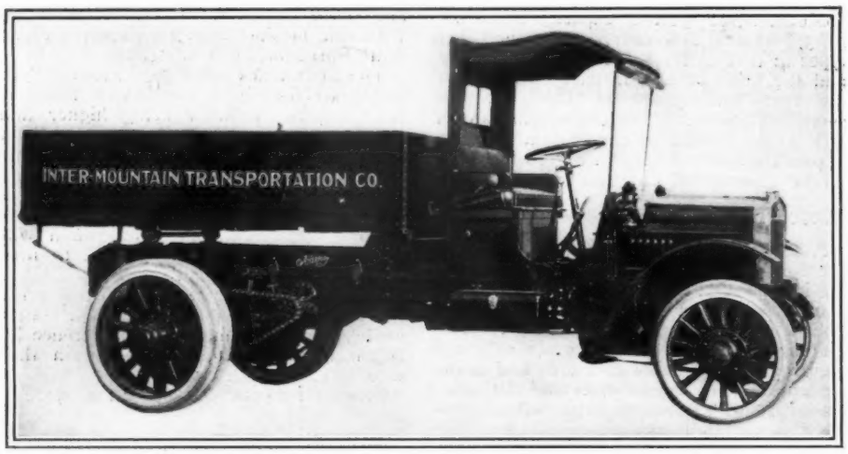
The Marmon truck has its engine under a forward hood and right steer with left control. The motor is supported on three points and inclined to the rear to give a straight line drive. The clutch is an asbestos-fabric-faced cone type and drives to the gearset located amidships. The gearset is a three-speed selective type integral with the rear axle, which is bevel driven and of three-quarter floating type.

Martin

Besides two models of fire apparatus the Martin Carriage Works, York, Pa., builds four models of commercial vehicles, the fourth of which, of 1-ton capacity, is a 1914 debutante. This model differs somewhat from the heavier types previously produced. No changes of moment other than minor refinements have been made in the continued models. The principles of construction of Martin trucks in the past have been the use of rolled channel stock in the frame, location of the motor under the floor, right steer and control, and chain drive to the wheels. The new model has a capacity of 1-ton and although it uses heat treated pressed steel frames, two wheelbase options have been offered, 124 and 132 inches respectively. In this model the motor is under a hood forward and the cab is mounted directly on the frame. The gearset and clutch are bolted rigidly to the



Kelly 3-tonner, hauling 20-ton boiler in Erie, Pa.



Atterbury with special dumping body suitable for mining work

motor, making a unit power plant, while in the old models the gearset was a unit with a jackshaft. Bodies for Martin trucks are built on special design only.

McIntyre

Trucks of five capacities are manufactured by the McIntyre Co., Auburn, Ind., ranging in size from 1,000 pounds to 5 tons. All models are chain driven with the exception of the smallest, and all except this model have four-cylinder engines. The complete line consists of a ½-ton two-cylinder and a ½-ton four-cylinder, which are practically identical with the exception of their power plants, a 1,500-pound motor wagon chassis, a 1,500-pound pneumatic tire chassis and trucks of 1½, 3 and 5 tons. The four-cylinder motors are 3⅜ by 3¾ and both motors are mounted on subframes, incorporated with the unit power plant type of disk-in-oil clutch and three-speed selective gearset. These models have left steer and motors under the forward bonnet. Motors on the 1,500-pound trucks are 4 by 5. The 3-ton and 5-ton chassis have structural channel steel frames, and motors are 4⅛ by 5¼.

Menominee

Three new models of 1,500-pound, 2,000-pound and 3,000-pound respectively are manufactured by the Poyer company, Menominee, Mich. These models supersede others of similar capacity built last year. All Menominee vehicles have their motors under the hood forward with the gearset and the flywheels bolted rigidly to the motor, final drive being through the shaft and bevel gears to the rear axle. The method of mounting the engine to the frame has been changed so as to increase the ease with which the power plant may be dismounted from the truck and so that the radiator connections come over, instead of under, the cross member.

Mercury

Continuing its single motor wagon chassis another year, the Mercury Mfg. Co., Chicago, announces no changes whatever. This 1,000-pound truck is characterized by the two-cylinder motor under the body, air cooling, a planetary gearset and double chain drive to high wheels in the rear. The construction of the Mercury truck is semi-flexible and the vehicle is built high from the ground in order to give great clearance on country roads. The use of ⅜-inch front wheels and 40-inch rear wheels is an unusual feature in this size of truck.

The Mercury motor is assembled with its gearset to form a unit power plant. The gasoline tank is carried on the front of the dash assuring gasoline feed on all grades and being readily accessible for refilling.

Modern

Expanded to three models, the line of the Bowling Green Motor Car Co., Bowling Green, O., now embraces capacities from 1,500 pounds to 1½-ton. The new model is of 3,000 pounds capacity and conforms to the practice in older Modern vehicles.

The complete line consists of a 1,500-pounder, a 1-tonner and a 1½-ton model, all of which have their motors under a forward hood. The motor on the 1,500-pound model is 3½ by 5, on the 1-tonner, 3¾ by 5¼, and on the new 1½-tonner, 4⅛ by 5¼. All are fitted with cone clutches and drive through selective gearsets mounted integral with the jackshaft and by the double chains to the rear wheels. All models continue left steer and center control. Changes in the 1914 vehicles comprise heavier frames, larger tires, and the change to Continental motors. All have wheelbases of 136 inches and, while solid tires are fitted as regular equipment, pneumatics will be provided as special equipment.

Mogul

Two, 2-ton, one 4-ton and two 6-ton Moguls are offered by the Mogul Motor Truck Co., St. Louis, Mo. The 2-tonners have the same motor, 4.125 by 5.25; the 4-ton has a 5.0 by 5.75 and the 6-ton types have a 5.25 by 5.75. All these are under the seat except that of one of the 2-ton models, which is in a forward bonnet. All models have chain final drive, but differences in certain features of design and in wheelbase, are responsible for the listing of two separate models of the same load carrying ability. One 2-ton has a cone clutch, the other a disk, for instance. One 6-tonner has a 155-inch wheelbase and the other 188.

Moore

Having entered the industry in 1913, the makers of Moore trucks continue three types of commercial vehicles for 1914. These vehicles are intended for medium to heavy trucking, arranged in capacities from 2 to 5 tons. The 5-tonner is of the American type with motor under the floor boards, and the others have their motors under the hood. Moore trucks are designed for California conditions.

The complete line consists of 2, 3 and 5-ton vehicles. Their motors are fitted with dual ignition controlled by a lever on the steering post, right steer and control being employed on all models. Cone clutches drive to three-speed selective gearsets on all models but the 5-tonner, whose gearset affords four speeds.—Pacific Metal Products Co., Torrance, Cal.

Monitor

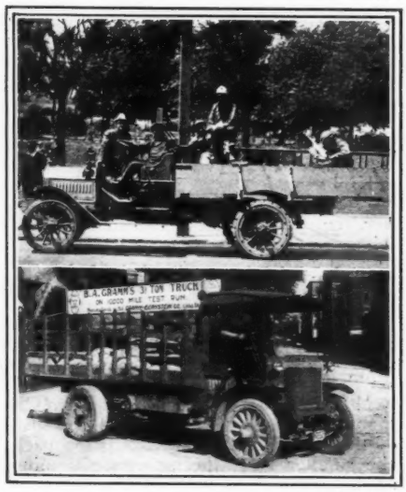
By the addition of a new model of 1,500 pounds capacity the Monitor line has been expanded to two models, including the continued 1-tonner of last season. The new truck is a considerable departure from the former practice of the Monitor, having its motor under a hood forward and driving through double chains instead of the bevel live axle formerly employed. Like the former model, it is built for solid tires and is mounted on elliptic springs in the rear. Left drive and center control have always been features of Monitor trucks and are continued on the new model. The 1-ton model has a four-cylinder Beaver unit power plant consisting of the motor, the dry disk clutch and a three-speed selective gearset. The motor is located beneath the cab floor and drives by shaft and bevel gears to a semi-floating rear axle. The new model has a four-cylinder 3½ by 4 Kermath motor included in a unit power plant with a cone clutch and a three-speed selective gearset. Bevels take the drive from the gearset to the jackshaft.—Monitor Automobile Works, Janesville, Wis.

Mora

Having added a four-cylinder motor to its line in the latter part of 1913, the Mora Power Wagon Co., Cleveland, enters 1914 without the two-cylinder chassis. The new model is of 1-ton capacity.

The Mora motor is block cast with valves all on the right side. It is 3 3-8 by 5 and designed to develop its power at low speed.

From the motor the drive is through a shaft to a planetary gearset incorporated with the jackshaft, from which it is taken by double chains. Other features of the truck which are new to Mora practice are underslung springs in the rear; jackshaft brakes operated by a foot-pedal and acting internally on drums, positioned between the frame and sprocket; bottle neck frame in front, and larger dimensions throughout. Left steer and center control are



Upper—G.M.C. 1¼-ton truck in telephone work. Lower—B. A. Gramm's 3½-ton truck

retained, and the vehicle is mounted on a pressed steel frame.

Moreland

Most prominent among the features of the Moreland vehicle, which is made by the Moreland Motor Truck Co., Los Angeles, is the fact that it is a pioneer in the use of low-gravity fuels in the commercial field. The Moreland truck is especially designed for use in the particular conditions to be encountered on the Pacific Coast.

These trucks are made in two types, the lighter vehicles being of the European type, with the motors under a forward hood and the heavier with motors under the floor board, or the American type. All models use right steer. Notable among the changes for 1914 is the modifications of capacities, the former 1¼-ton being this year 1½-ton; the 2-ton being 2½-ton; the 3-ton being 3¼-ton, and the 4 and 6½-tons being dropped. The new models are the 1,500-pound and 1-ton delivery types with the motors under forward hoods.

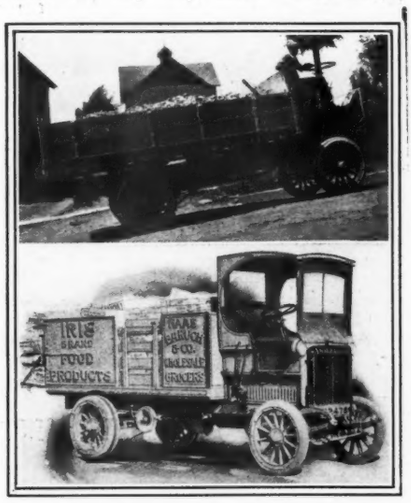
All are chain driven, electrically lighted and supplied with the Master distillate carbureter and the Moreland gasifier.

Morton

Both trucks and tractors are manufactured by the Morton Truck & Tractor Co., Harrisburg, Pa., the former in capacities of 2, 3 and 5 tons, the latter in a capacity of 10 tons. The former have been modified for 1914 by the change from chain drive to worm drive on the rear axle, and the four-wheel-drive tractor has been changed by the substitution of worm-driven axles for the type formerly employed. All Morton vehicles are built with their motors under the floor boards and with optional left or right steer. The Morton company is one of the few who still adhere to steam, the 5-ton and 10-ton sizes being fitted with high power steam engines in connection with a new type of flash boiler generating system. The 2 and 3-ton sizes are fitted with gasoline engines. All models are fitted with governors which limit the speed of the gasoline engines to 1,500 revolutions per minute.

Natco

There have been no important changes in the Natco 1-ton truck, which is the only capacity made by the National Motor Truck Co., Bay City, Mich. Such alterations as have been made are only in minor details which go to refine the present job. The motor is four-cylinder 3 1-2 by 5 and the drive is through jackshaft and inclosed side chains. The motor is under the drive seat, and the drive on the left. The wheelbase is 104 inches and this gives a length of 96 inches back of the seat.



Top—King 7,000-pound truck carrying stone. Bottom—Moreland 2-ton truck in transportation work

Locomobile 5-ton truck with pole trailer

Nelson-Le Moon

Nelson & Le Moon, Chicago, Ill., build trucks in 3-4, 1, 1-2, 2, 3 and 5 tons capacity to conform to the individual needs of each customer. Bodies are not furnished. The three smaller models are worm driven while the larger types have chain drive. All have the motor under the bonnet and right steering is common to the entire line. The three worm driven vehicles adhere to the same design throughout. In all these trucks, the wheelbase and load space are optional.

Nevada

The Nevada is a four-wheel gear drive truck and is made with a capacity rating of 3 tons. The present model is an entirely new job and conveys the power to each of the wheels through shafts. The driver's seat is over the motor and the steering is on the right. The truck uses a 4 1-2 by 6 1-2 Waukesha motor and also incorporates a Cotta dog clutch gearset in which the gears are always in mesh. The length of the loading platform is 12 feet maximum, while the width is 40 inches. The Nevada Mfg. Co., Nevada, Ia., is the maker.

New York

Tegetmeier & Riepe, New York City, are in the market with a 3,000-pound truck with New York as its trade name. The car drives from a four-cylinder block 3 3-4 by 5 1-4 motor of 30 horsepower back through a three-speed gearset to a jackshaft from which side chains convey the power to the rear. The seat is back of the motor. The wheelbase is 120 inches, the overall length 191 inches, the load space 8 1-2 to 10 feet long and 4 to 6 feet wide.

O. K.

A light delivery of 1,200 pounds capacity is being marketed by the Star-Tribune Motor Sales Co., Detroit, Mich., under the name O. K. This is a motor under the hood type. The cylinder dimensions are 3.5 by 4.25 and the rated horsepower 19.6. The drive is by shaft to the rear axle, the gearset being in unit with the engine. The car is fitted with pneumatic tires. Two body types are fitted—an inclosed and an open design. The closed body has a load space 70 by 46 by 52 inches.

Overland

Built upon its regular model 79 chassis as used for passenger cars, the Overland light delivery, product of the Willys-Overland Co. at Toledo, makes a speedy vehicle for the delivery use of florists, butchers and the like. This vehicle has a 35-horsepower motor and the power goes by shaft direct to the rear axle where the gearset is located. The motor is a 4 1-8 by 4 1-2 and is under a forward hood. The steering is on the right and control in the center. Wheelbase is 114 inches and the tires 33 by 4 pneumatic.

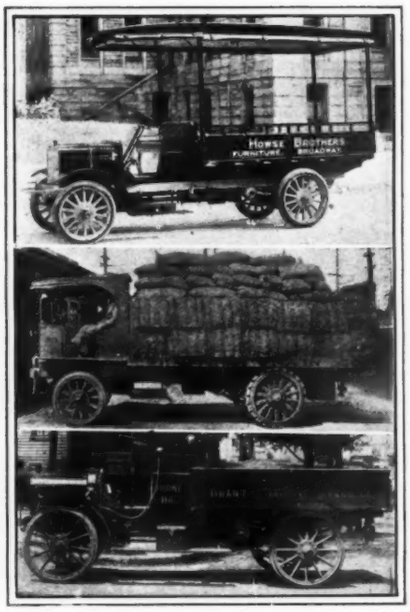
Packard

Within the past year, the Packard company has added two sizes of trucks to its offering. These are a 4-ton and a 6-ton unit. The line besides these consists of 2-ton, 3-ton and 5-ton types. The only essential change in Packard truck construction for the current year is the discarding of the former brace rod construction on the 3-ton unit for a new form. The 2-ton unit will shortly be so constructed.

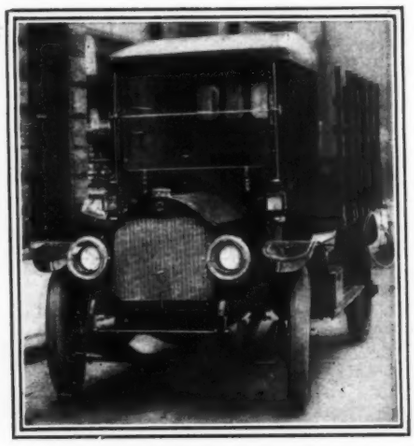
Motors of the Packards are under a bonnet forward of the driver's seat. The transmission of power is through gearset to jackshaft, and thence by side chains to the driving wheels. The drive is on the right. Much latitude is given the purchaser in the matter of loading space. Several wheelbases are optional on each unit. The 4-ton, as an example, is provided with 126, 144 and 168-inch wheelbase at the same price, while at a slight additional cost, it is furnished with 192-inch wheelbase.

Palmer-Moore

With either a water-cooled or an air-cooled motor, the Palmer-Moore truck, product of Palmer-Moore Co., Syracuse, N. Y., is made for a capacity of 1,600 pounds only. The water-cooled engine is new, these vehicles being driven by a three-cylinder, two-cycle engine exclusively heretofore. The water-cooled type, however, is of the same dimensions, 4 by 4, as the air-cooled, and also of the same two-cycle design. Therefore, the two are really interchangeable in the same chassis, the water-cooled engine requiring a radia-



Top—Gramm 1-ton model. Model—Garford 4 to 6-ton truck. Bottom—Bessemer 2,000-pounder



Menominee 1,500-pound delivery car

tor, of course. The truck has a 102-inch wheelbase and employs a jackshaft and side chains.

Peerless

The four models of Peerless trucks—3-ton, 4-ton, 5-ton and 6-ton—are continued substantially without changes. But while there have been no mechanical changes in the chassis, they have been adapted by special construction and by altering the length of the frame and the wheelbase to some special types of service. The Peerless truck motor is a 40 horsepower, four-cylinder, pair-cast T-head, size 4 1-2 by 6 1-2. This drives back to a jackshaft with which the gearset is combined. Then side chains take the power to the rear wheels. Each truck is listed with a long and short wheelbase, which gives wide body latitude. On the 3-ton, for instance, the wheelbase of 151 inches gives a length of 126¼.

Perfex

The Perfex is a 100-pound delivery vehicle with its engine under the bonnet. It is made by a newcomer—the Perfex Co., Los Angeles, Cal. The design it incorporates is a 3.375 by 4 motor which drives through direct shaft, cone clutch and three-speed gearset to the rear axle. The wheelbase is 116 inches and the car is mounted on pneumatic tires.

Pierce-Arrow

Pierce-Arrow trucks are made in 2-ton and 5-ton units. The 2-ton was added during the past year. These trucks which are similar in design, differ from the conventional principally in the use of worm drive with the worm above the gear. Side chains and jackshaft are eliminated, the gearbox being forward. The motor is placed under a hood at the front and the drive back of it, on the right. The 2-ton has a 25-horsepower, 4 by 5.5 motor, while the 5-ton is fitted with a 38-horsepower 4.875 by 6. The cylinders are T-heads and in pairs. The wheelbase of the 2-ton ranges from 150 to 180 inches, while that of the larger is optional, depending upon the application.

Pope-Hartford

In 3- and 5-ton capacities, Pope-Hartford trucks are continued for the current year. The Pope Mfg. Co., Hartford, Conn., is the maker. These trucks both have a 4.75 by 5.5 engine, the heavier truck being geared down lower. The motor is placed either under the seat or under the hood and drives back through shaft to jackshaft and side chains. The steering is on the left and control in the center. The 3-ton has a standard wheelbase of 138 1-2 inches and the 5-ton, 140 inches.

Reo

The Reo company, Lansing, Mich., is in the market with a 1,500-pound light delivery wagon and a 2-ton truck. These are practically continuations from last year with no material alterations or differences. The light delivery locates its horizontal 4 3-4 by 6 motor under the driver's seat with the radiator in front. It has chain final drive from jackshaft and the wheelbase is 90 inches. The express body measures 42 by 72, while stake body is 48 by 84.

The 2-ton truck is also provided with final chain drive from a jackshaft, which gets its power from a 35-horsepower, 4 by 4.5 vertical, four-cylinder power plant. The standard wheelbase is 130 inches, while 146 is optional. The motor is placed in forward bonnet and this gives room for a 115 by 62 stake body or a 120 by 54 express, or any other type desired.

Republic

Although the Alma Motor Truck Co., Alma, Mich., made a 1,500 to 2,000 pound Republic truck heretofore, it is now a 2,000-pound type. This is really an increase in capacity, since the maximum allowable load heretofore is now the normal load. Besides this and making the frame 9 inches longer and increasing the wheelbase 8 inches—it is now supplied either 116 or 124 inches—the Republic has come in for little change. The car incorporates a chain drive and jackshaft, the power being supplied by a 3.75 by 5.25 Continental engine which is forward under a bonnet.

Sanford

Two models for capacities of 1 and 1 1-2 tons comprise the line of the Sanford Motor Truck Co., Syracuse, N. Y. The new models are in general design the same as the 1913 models. They are each about 200 pounds heavier, however, which is largely due to steel and parts of increased diameter to better withstand the road shocks and add to the truck life. In the new editions, castellated nuts and cotter pins have been liberally used, replacing lock washers, as it has been found that even the latter work loose. Both tmodels use a 4 by 4.5 motor, the larger truck being geared down lower than the other. Jackshaft and side chain construction is used. The 1-ton has a wheelbase of 100 inches, and the 1 1-2-ton, 118. The engine is under the driver's cab.

G. A. Schacht

Upon the discontinuance of the Schacht Motor Car Co. the G. A. Schacht Motor Truck Co., Cincinnati was formed, employing a design similar to that of the Schacht trucks. But one model of these has been continued, this the 8-ton worm-driven type, upon which small improvements have been made.

In design the G. A. Schacht truck follows European lines, the motor being under a hood. The frame is of channel stock and heavily gusseted.

Changes from the 2-ton Schacht consist of heavier axles, and instead of the complete axle being purchased, as formerly, the company expects to build its own axles in the future, buying the worms complete from outside makers.

The motor is a four-cylinder block type 4 1-4 by 5 1-2. A spring-inserted leather-faced cone clutch drives to the three-speed selective gearset, which in turn drives through a shaft to the worm-driven axle with its overhead worm.

Selden

Selden Motor Vehicle Co., Rochester, N. Y., makes a 1-ton vehicle of the motor-under-bonnet type having left steer and center control. The motor, a 3.75 by 5.25 drive back to jackshaft and side chains. There are two wheelbase lengths to this truck. On the 125-inch length, the available load space back of the seat is 102 inches on a frame width of 32 inches. On the 145-inch wheelbase, there is 122 inches load space to the rear of the seat.

Service

Service Motor Car Co., Wabash, Ind., makes 1 1-2-, 2- and 3-ton trucks. These are all entirely new and were recently placed upon the market. All have the motors under the forward bonnet and use left steer and center control. The 1 1-2, and 2-tonners are fitted with a 4.125 by 5.5 engine of 40 horsepower, while the 3-ton has a 45-horsepower motor, 4.25 by 5.5. These cars have chain final drive from jackshaft, and the wheelbases are 145, 150 and 171 inches, respectively.

Siebert

From the Shop of Siebert, Toledo, O., emanates a 3-4-tonner which is along conventional lines in design. The motor is placed in a forward bonnet and drives back to a jackshaft, which has chains running to the rear whels. The engine is a 30-horsepower, 3.75 by 4.5 of Buda make. Drive is on the left and levers in the center. The wheelbase of 115 inches gives room for an ample body. This car is a continuation and the only change of note is the more accessible location of grease cups. A Mea magneto replaces another make.

Sowers

The 1 1-2-ton truck made by the Sowers Motor Truck Co., Boston, Mass., was a newcomer to the truck field last year. It

is made both in motor-under-hood and motor-under-bonnet types and is chain-driven from jackshaft. It uses a 3.75 by 5 Wisconsin block motor. The motor-under-bonnet design has a 140-inch wheelbase, while the other is 120 inches. The length of the loading space in the standard body is 126 inches and the width 72 inches.

Speedwell

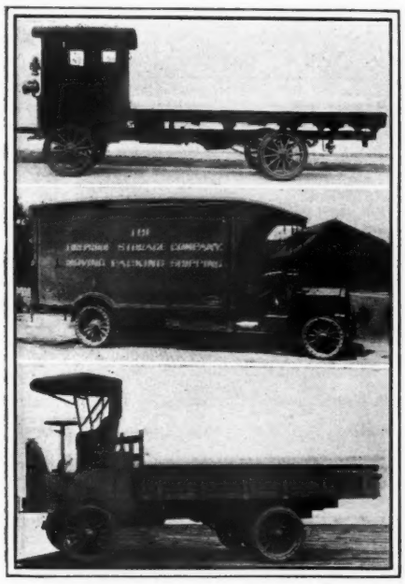
Speedwell trucks for 1914 are the same in every respect as last year and no new models have been added. The capacities are 2, 4 and 6 tons and the motors of all are located under the seats. The drive is on the left and control in the center. Throughout, the design is consistently the same, making use of jackshafts and side chains. Frames are well braced and lengths are adaptable for different service conditions. The 2-ton is offered in 115-wheelbase only, giving 110 inches back of seat. The 4-ton is 115-wheelbase standard, option being given of 139 inches. That of the 6-ton is 139 inches only.

Standard

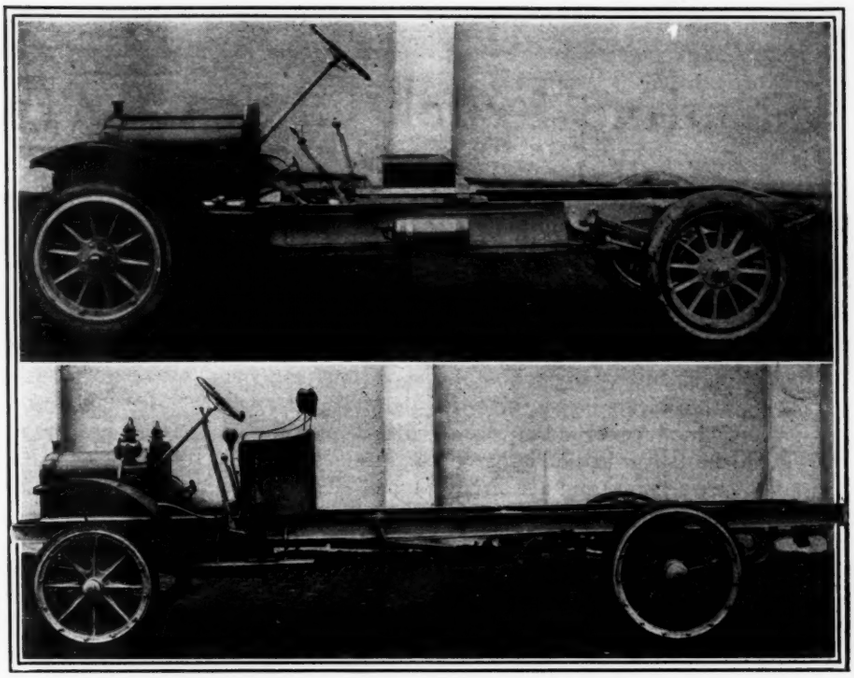
Standard motor trucks come in 3-ton units and are constructed from parts made by well-known parts makers. The motor is a Continental 4.5 by 5.5, developing 32.4 S. A. E. horsepower. This is located forward under the bonnet and drives back through shaft to jackshaft and thence to side chains. The wheelbase is made optional, the standard being 120 inches, giving a minimum of 123 inches and maximum of 171 inches back of seat. Wheelbases up to 216 inches are listed with correspondingly greater load spaces.—Standard Motor Truck Co., Detroit.

Standard-Cleveland

The Standard Motor Truck Co., Cleveland, submits 1 and 1 1-2-ton trucks to the public. These both have the same 4 by 4.5 Hazard motor which is placed under the bonnet forward. The two chassis are practically the same except for the larger tire equipment of the greater capacity model and certain frame strengthening to take care of the higher load. In order to accommodate any body requirements, the wheelbase of the 1-ton is optionally either 124 or 134 inches, while besides these lengths, the 1 1-2 ton also is provided in 144-inch length.



Top—Transit 2-ton model with cab for driver. Middle—Peerless 4-ton chassis with moving van body. Bottom—Speedwell 4-ton type with express body



Top—White 1,500-pound chassis. Lower—White 3-ton chassis

Stanley

Steam trucks in 1,500 and 2,500 pounds capacity are marketed by the Stanley Motor Carriage Co., Newton, Mass. Neither of these is a new model and the same design features are incorporated in them as are found in the passenger cars of this make. The motors are connected direct to the rear axles, being located directly in front of them. The boilers are placed in front of the dash directly over the front axles. These cars are fitted with pneumatic tires.

Star

Star trucks, product of the Star Motor Truck Co., Ann Arbor, Mich., come in 1-ton and 2-ton units. While there are novelties in this new line, nevertheless, there is an intelligent combination of standard parts. The motors are Continentals, the 2-ton having a 4.125 by 5.25, and the smaller a 3.75 by 5.25. They have chain final drive from jackshaft, with which is incorporated Brown-Lipe gearset. The 2-ton has a minimum load length of 128 inches and width of 65 inches.

Stegeman

Five capacities are listed by Stegeman Motor Car Co., Milwaukee, Wis. These are a 3-4-ton, 1-ton, 2-ton, 3-ton and 4-ton models and all conform to the same general design except the 3-4-ton, which has a shaft drive to the rear instead of chain final drive from a jackshaft which is incorporated in the others. There are three sizes of motors used with these vehicles. The 3-4 and 1-tonners have a 3.375 by 5.25, the 2-ton has a 4.125 by 5.25 and the other have a 4.5 by 5.5.

Sternberg

The latest addition to the Sternberg array of vehicles is a 7-tonner, which was announced last July. The sizes are 2, 2 1-2, 3, 4, 5, 6 and 7 tons. The 7-ton conforms to the same design features as the older members of the line. All except the 2 1-2 ton have the motor under the seat and chain and jackshaft drive. The 2 1-2-ton is fitted with a forward bonnet and its drive is by a direct shaft and worm gearing, the worm being above. The wheelbase of the four heavy models is 144 inches, that of the 3-ton, 130-160, of the 2 1-2-ton, 148 and of the 2-ton, 116-160.

Stewart

Stewart Motor Corp., Buffalo, offers only a 1,500-pound vehicle for semi-light delivery service. This machine has direct shaft drive to the rear axle and the radiator is placed back of the motor next to the dash. The seat is back of this. Although there are no new models, several minor changes have been made, the most important of which are the equipping of 34 by 4 1-2 pneumatics on Q. D. demountable rims instead of 34 by 4, and the changing of wood covered running boards to pressed steel. A foot accelerator is now fitted also. These cars have left steer and the loading space in standard bodies furnished is 84 by 45 inches along with a height of 60 inches. The motor is a 3.75 by 5.2[illegible].

Studebaker

The Studebaker Corp., Detroit, Mich., has a new light delivery vehicle of 1,500 pounds capacity, which supersedes the types announced a year ago. This new vehicle is equipped with the standard four-cylinder motor as used in the passenger cars of this make, having a bore of 3.5 and a stroke of 5 inches. The drive to the rear is through shaft, and the car has the distinction of being equipped with electric starter and lights. This has been put on to offset the argument of economy in favor of the electric car for frequent-stop service. Another new feature is the location of the gasoline tank on the dash, making quick filling and better carbureter feed possible. The car has left drive and center control, 106 1-2

(Continued on page 272.)

Gasoline Truck Chassis on the 1914 Market

Load Capacity, Chassis Price and Complete Specifications of Practically Every Gasoline Truck Chassis Produced by Manufacturers of the United States at the Present Time—Horsepower According to S.A.E. Formula

ON these and the following pages appear the most important specifications of the various commercial vehicles listed for 1914, the tables covering 306 chassis models turned out by 137 different concerns. It should be borne in mind that these specifications are based on chassis only, and not on body types. To explain: Some of the companies herein listed with but one, two or three different chassis models may have ten or twelve different types of vehicles, according to the bodies mounted. A list of the body styles made by each of the companies appears on pages 230 to 233, inclusive, of this issue of THE AUTOMOBILE.

Insight Into Mechanical Details

A study of the specifications given in the tables will give the truck owner or the prospective purchaser of commercial vehicles a very good idea of the various parts of the modern machine of that description, and of what may be expected of them in the way of strength, durability and performance. When the motor truck first made its appearance it was somewhat of a nondescript, much as the cyclecar, the latest motor vehicle to come into the field, is at the present time. All sorts of strange designs came out and were seriously given a trial. How different they were from the trucks of today, which are gradually becoming more or less standardized under various classifications!

The tables are the best possible indicators of the general trend in commercial vehicle design, the best practice being usually conceded to be that which is followed by the majority of the well-known makers. Of course, principles embodying the greatest facility of production, together with the lowest possible cost compatible with the best of material and workmanship, are the most efficient. But many makers have some special features which they think well worth the additional time and expense incurred in the production of the trucks as making the vehicles of greater value to the user, and, consequently, a better recommendation for the manufacturer.

Standardization and Its Progress

In the way of standardizing the mechanical details of commercial vehicles, the work of the Society of Automobile Engineers is of importance, the matter of wheel sizes having been decided at the recent meeting of the society. The truck standards division has other features under consideration.

Owing to the fact that there will be no national motor truck shows this year, the tabulations published herewith should prove doubly useful and valuable to the user

NAME AND MODEL	Load Capacity, Pounds	Chassis Price	Wheelbase, Inches	TIRES			Motor Location	No. Cylinders	Bore and Stroke, Inches	S.A.E. H.P	CYLINDERS		Valve Location	Camshaft Drive	COOLING	
				Kind	Front	Rear					Shape	How Cast			Circulation	Radiator Suspension
Adams, A	2,000	$1,850	121-36	Solid	36x3½	36x4	Under hood	4	3.875x5.000	24.00	L-head	Block	Right	Gear	Pump	Cushions
Adams, D	3,000	2,300	136	Solid	36x3½	36x3½	Under hood	4	3.875x5.000	24.00	L-head	Block	Right	Gear	Pump	Cushions
Adams, E	4,000	2,500	140	Solid	36x4	36x4*	Under hood	4	3.875x5.000	24.00	L-head	Block	Right	Gear	Pump	Cushions
Admiral, C	3,000	1,475	125	Solid	34x3½	34x4	Under hood	4	3.500x5.000	19.60	L-head	Block	Right	Gear	Thermo	Springs
A. I. C., C	10,000	3,500	136	Solid	36x6	40x6*	Under hood	4	4.250x6.750	28.90	L-head	Pairs	Left	Gear	Pump	Springs
Anglaize, H	2,000	950	96	Solid	36x3	36x3	Under seat	2	5.250x4.000	22.00	I-head	Sep		Gear	Thermo	
Anglaize, G	2,000	1,350	110	Solid	36x3	36x3½	Under hood	4	3.500x5.000	19.60	L-head	Block	Right	Gear	Thermo	
Armleder, B	2,000	2,200	136	Solid	40x4	40x5	Under hood	4	4.125x5.250	27.25	L-head	Block	Right	Gear	Pump	Springs
Armleder, H	4,000	2,150	136-60	Solid	40x4	40x3*	Under hood	4	4.500x5.000	32.40	L-head	Block	Right	Gear	Pump	Springs
Armleder, E	5,000	2,500	136-60	Solid	40x4	40x3½*	Under hood	4	4.500x5.000	32.40	L-head	Block	Right	Gear	Pump	Springs
Atterbury, A	1,500		118	Pneu.	34x4	34x4	Under hood	4	3.500x5.000	19.60	L-head	Block	Right	Gear	Thermo	S & T
Atterbury, B	2,000		128	Solid	36x3½	36x4	Under seat	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	S & T
Atterbury, C	4,000		143	Solid	36x3½	36x3½*	Under hood	4	4.250x5.500	28.90	L-head	Block	Left	Gear	Pump	S & T
Atterbury, D	6,000		153	Solid	36x4	36x4*	Under hood	4	4.875x5.500	38.00	T-head	Pairs	Opp	Gear	Pump	S & T
Atterbury, E	10,000		153	Solid	36x5	42x6*	Under hood	4	4.875x5.500	38.00	T-head	Pairs	Opp	Gear	Pump	S & T
Autocar, F	3,000		97	Opt	34x4	34x5	Under seat	2	4.750x4.500	18.00	L-head	Sep	Side	Gear	Pump	Springs
Available, 25	2,000	1,350	120	Solid	36x3	36x3½	Under floor	4	3.750x4.500	22.50	L-head	Block	Right	Gear	Thermo	Springs
Avery, C-1	2,000	1,690	128	Solid	34x3½	34x5	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Avery, B-2	4,000	2,700	128	Solid	36x4	36x3½*	Under seat	4	4.750x5.000	36.10	L-head	Sep	Left	Gear	Pump	Springs
Avery, B-3	6,000	3,200	128	Solid	38x5	38x4*	Under seat	4	4.750x5.000	36.10	L-head	Sep	Left	Gear	Pump	Springs
Avery, A-3	6,000	3,200	140	Wood			Under seat	4	4.750x5.000	36.10	L-head	Sep	Left	Gear	Pump	Springs
Avery, B-5	10,000	4,500	140	Solid	38x6	38x5*	Under seat	4	5.250x5.750	44.10	T-head	Pairs	Opp	Gear	Pump	Springs
Barker, U	2,000	2,000	130	Solid	42x3½	42x5	Under hood	4	4.000x5.000	25.60	L-head	Block	Right	Gear	Opt	Springs
Bauer, A & C	1,000	1,000	96	Solid	36x2	36x2	Under hood	4	3.750x5.000	22.50	L-head	Block	Right	Gear	Thermo	Rigid
Bauer, B & D	1,500	1,000	96	Solid	36x2	36x2½	Under hood	4	3.750x5.000	22.50	L-head	Block	Right	Gear	Thermo	Rigid

**Drives on four wheels.

ABBREVIATIONS:—Tires: Pneu, pneumatic; *, dual tread. **Motor Location:** Bet Seats, between seats. **Cylinders:** Sep, separately cast. **Valve Location:** Opp, opposite; S & H, side and head. **Camshaft Drive:** Gear, type not known; Hel'l, helical. **Cooling:** Thermo, thermo-syphon. **Radiator Suspension:** S & T, springs and trunnions. **Ingition:** Sing, single; Doub, double; 2-Pt, two point; Auto, automatic; Gov, governed; Opt, optional. **Motor Lubrication:** Spl-pres, splash and pressure. **Clutch:** Exp bd, expanding band; Con bd, contracting band.

of commercial vehicles, the prospective purchaser, the dealer, the manufacturer, the salesman and the engineer.

Some Preparing New Models

Of course, there are a few companies whose names do not appear in the tabulation, owing to the fact that they are not in a position to furnish information regarding their models, generally because they are preparing new ones.

The information used in compiling the tables was all obtained directly from the manufacturers, and in places where it is not complete, the omission is due to the dimensions, location or design of the part in question not having been finally decided upon. The various columns call for little, if any, explanation. Where optional wheelbases are listed it means that the makers do this to accommodate the chassis to different body types which require loading platforms varying considerably in length.

Considerable ingenuity is being displayed in the design of special bodies suited to certain kinds of work. Thus, a hardware or steel company generally includes some provision for carrying long pipes or rods of metal, often putting brackets on the front fenders, and also using a long platform.

S. A. E. Formula for Horsepower

The horsepower given is not necessarily that listed by the manufacturer, but the rating computed by the formula of the Society of Automobile Engineers, which is based on the cylinder bore and the number of cylinders, and only indirectly takes the piston stroke into consideration.

The load capacity is given in pounds. Each manufacturer makes a certain allowance for the weight of the body, so when a truck user wants to put a body on a new chassis or to change the type of body, he must take into consideration this allowance in order not to mount too heavy a body and thus impose an excessive strain on the mechanical parts of the chassis. The building of commercial vehicle bodies is fast becoming an engineering job, and each body must be different, namely, especially designed and constructed for the variety of work the truck is expected to perform. A specific example of the effect of disregard of the truck maker's allowance is: If a truck user purchases a 1-ton truck on which the manufacturer's allowance for body weight is 500 pounds, and puts a 1,000-pound body on it, his truck immediately becomes a 1,500-pound vehicle, which is 25 per cent. overloaded if he carries a ton on it.

The chassis price of commercial vehicles generally includes everything except the body. The seat, lamps, tools, horn and speedometer and starter, if such are fitted are all included in this price, unless the manufacturer specifies otherwise.

Some Self-Starters This Year

This year is the first to see self-starters fitted on trucks. There has been considerable discussion as to the necessity and advisability of including these devices in the equipment of the commercial vehicle, some makers claiming that they would be uneconomical and generally unsatisfactory, while others contended that their adoption would obviate the necessity of leaving the motor running while the driver or his helper is delivering parcels or merchandise, and would also tend toward economy in other ways. The views of some of the leading manufacturers on this subject are published on pages 260 to 262, inclusive of this issue of THE AUTOMOBILE.

Speedometers Are Valuable

Several of the makers are furnishing speedometers this year as regular equipment, this being an excellent feature with reference to keeping the drivers from overspeeding and thus incurring all the evils consequent upon this transgression of the owner's orders.

IGNITION			Carbureter	Motor Lubrication	TRANSMISSION						RUNNING GEAR				BEARINGS		NAME AND MODEL
						GEARSET					SPRINGS		CONTROL				
									Gear Ratio on High	Final Drive			Location				
System	Magneto	Control			Clutch Type	Type	Location	No. Forw'd Speeds			Front	Rear	Steering	Gear-Shift	Gearset	Rear Axle	
Sing...	Eisemann..	Hand....	Schebler....	Spl-Pres..	Disk...	Sel....	Amid..	3	7.45-1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Opt....	.....Adams, A
Sing...	Eisemann..	Hand....	Schebler....	Spl-Pres..	Disk...	Sel....	Amid..	3	7.45-1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Opt....	.....Adams, D
Sing...	Eisemann..	Hand....	Schebler....	Spl-Pres..	Disk...	Sel....	Amid..	3	7.45-1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Opt....	.....Adams, E
Sing...	Bosch.....	Fixed....	Schebler....	Spl-Pres..	Cone ..	Sel....	Unit J .	3	.....	Chain....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Roll...	.....Admiral, J
Sing...	Simms.....	Hand....	Holley.....	Splash...	Cone ..	Sel....	Amid..	4	8.00-1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	.....A. I. C., C
Dual...	Remy.....	Gov.....	Schebler....	Spl-Pres..	Disk...	Plan...	Unit J .	2	4.00-1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Plain ..	Roll...	.....Anglaize, H
Dual...	Remy.....	Hand....	Schebler....	Spl-Pres..	Disk...	Sel....	Unit M.	3	4.00-1	Int G....	½ Ell...	½ Ell...	Left...	Center.	Plain ..	Roll...	.....Anglaize, G
Sing...	Bosch.....	Hand....	Schebler....	Splash...	Disk...	Sel....	Unit M.	3	5.00-1	Bevel....	½ Ell...	Ell....	Left...	Center.	Ball...	Ball...	.....Armleder, B
Sing...	Bosch.....	Hand....	Schebler....	Splash...	Disk...	Sel....	Amid..	3	8.00-1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	.....Armleder, H
Sing...	Bosch.....	Hand....	Schebler....	Splash...	Disk...	Sel....	Amid..	3	8.00-1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Plain ..	.....Armleder, E
Sing...	Bosch.....	Fixed....	Stromberg..	Spl-Pres..	Disk...	Sel....	Unit M.	3	6.00-1	T Worm .	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	.....Atterbury, A
Sing...	Bosch.....	Fixed....	Stromberg..	Spl-Pres..	Disk...	Sel....	Unit M.	3	6.75-1	T Worm .	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	.....Atterbury, B
Dual...	Bosch.....	Hand....	Stromberg..	Spl-Pres..	Disk...	Sel....	Unit M.	3	Opt....	Opt.....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	.....Atterbury, C
Dual...	Bosch.....	Hand....	Stromberg..	Spl-Pres..	Disk...	Sel....	Unit J .	3	8.40-1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	.....Atterbury, D
Dual...	Bosch.....	Hand....	Stromberg..	Spl-Pres..	Disk...	Sel....	Unit J .	3	8.40-1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	.....Atterbury, E
Sing...	Bosch.....	Fixed....	Stromberg..	Spl-Pres..	Disk...	Prog...	Amid..	3	7.10-1	Bevel....	½ Ell...	Plat....	Right..	Right..	Roll...	Roll...	.....Autocar, F
Dual...	Briggs.....	Hand....	Schebler....	Splash...	Cone ..	Sel....	Unit J .	3	6.00-1	Chain....	Ell....	Ell....	Left..	Left...	Ball...	Ball...	.....Available, 25
Dual...	Heinze.....	Hand....	Rayfield....	Spl-Pres..	Disk...	Sel....	Unit M.	3	7.95-1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Roll...	.....Avery, C-1
Dual...	Eisemann..	Auto.....	Rayfield....	Spl-Pres..	Disk...	Sel....	Unit J .	3	18.00-1	Chain....	½ Ell...	½ Ell...	Right..	Center.	Roll...	Roll...	.....Avery, B-2
Dual...	Eisemann..	Gov.....	Schebler....	Splash...	Disk...	Sel....	Amid..	3	13.73-1	Chain....	½ Ell...	½ Ell...	Right..	Center.	Roll...	Roll...	.....Avery, B-3
Dual...	Eisemann..	Gov.....	Schebler....	Splash...	Disk...	Sel....	Amid..	3	13.73-1	Chain....	½ Ell...	½ Ell...	Right..	Center.	Roll...	Plain..	.....Avery, A-3
Dual...	Eisemann..	Gov.....	Schebler....	Spl-Pres..	Disk...	Sel....	Unit M.	3	9.90-1	Chain....	½ Ell...	½ Ell...	Right..	Center.	Roll...	Roll...	.....Avery, B-5
Sing...	Eisemann..	Fixed....	Stromberg..	Spl-Pres..	Disk...	Sel....	Unit M.	4	8.60-1	T Worm .	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	.....Barker, U
Doub..	Opt.....	Hand....	Schebler....	Splash...	Disk...	Sel....	Unit M.	3	5.00-1	Bevel....	½ Ell...	Ell....	Right..	Center.	Ball...	Roll...	.....Bauer, A & C
Doub..	Opt.....	Hand....	Schebler....	Splash...	Disk...	Sel....	UnitM.	3	5.00-1	Bevel....	½ Ell...	Ell....	Right..	Center.	Ball...	Roll...	.....Bauer, B & D

ABBREVIATIONS:—Gearset: Sel, selective; Prog, progressive; Plan, planetary; Fric, friction; Ind C, individual clutch. **Gearset Location:** Amid, amidships; Unit M, unit with the motor; Unit J, unit with the jackshaft; Unit X, unit with the rear axle. **Final Drive:** Int G, internal gear; Bevel, shaft with bevel; T Worm, shaft with top worm; Chain, by chain to the rear wheels. **Springs:** ½Ell, semi-elliptic; Ell, elliptic; ¾Ell, ¾ elliptic; Plat, platform. **Bearings:** Roll, roller; B & R, ball and roller; Opt, optional.

Gasoline Truck Chassis on the 1914 Market

NAME AND MODEL	Load Capacity, Pounds	Chassis Price	Wheel-base, Inches	TIRES			Motor Location	No. Cylinders	Bore and Stroke, Inches	S. A. E. H. P	CYLINDERS		Valve Location	Camshaft Drive	COOLING	
				Kind	Front	Rear					Shape	How Cast			Circulation	Radiator Suspension
Bessemer, C	1,000	1,250	108	Solid	34x2½	34x3	Under hood.	4	3.500x4.500	19.60	L-head	Block	Left	Gear	Thermo.	S & T
Bessemer, B	4,000	1,800	120	Solid	34x3½	34x4	Under hood.	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Thermo.	S & T
Bessemer, A	6,000	2,100	136	Solid	34x4	34x5	Under hood.	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Thermo.	S & T
Best, A	1,000	750	78	Opt.	32x2	34x2½	Under floor.	2	4.500x4.500	16.20	L-head	Sep.	Head	Gear	Thermo.	Springs
Best, C	1,600	1,370	106	Opt.	35x3	35x3½	Under hood.	4	3.750x4.500	22.50	L-head	Block	Right	Hel'l	Thermo.	Springs
Blair, C	4,000	2,850	114-21	Solid	34x4	34x3*	Bet seats.	4	4.250x5.250	28.90	L-head	Block	Left	Hel'l	Pump	Springs
Blair, D	5,000	3,250	121-44	Solid	34x4	36x3½*	Bet seats.	4	4.500x5.500	32.40	L-head	Pairs	Left	Hel'l	Pump	Springs
Blair, E	7,000	3,750	135-44	Solid	36x5	36x4*	Bet seats.	4	4.500x5.500	32.40	L-head	Pairs	Left	Hel'l	Pump	Springs
Brown	1,500	1,650	122	Cush.	34x4½	34x4	Under hood.	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Buckeye, V-1	800	900	106	Pneu	30x3½	31x4	Under hood.	4	3.500x4.250	19.60	L-head	Block	Left	Gear	Pump	Springs
Buckeye, V-2	1,500	1,125	114	Opt.	35x3	35x3½	Under hood.	4	3.750x4.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Buckeye, V-4	3,000	1,900	120	Solid	36x3½	36x4	Under hood.	4	4.500x5.000	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Buckeye, V-5	4,000	2,200	120	Solid	36x4	36x5	Under hood.	4	4.500x5.000	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Buick, 3	1,000	1,000	100	Pneu	33x4½	33x4½	Under hood.	4	3.000x5.000	14.40	L-head	Block	Right	Gear	Thermo.	Rigid
Buick, 4	1,500	1,125	122	Pneu	35x5	35x5	Under hood.	4	3.000x5.000	14.40	L-head	Block	Right	Gear	Thermo.	Rigid
Butler, 1914	1,500	1,650	126	Pneu	35x4½	35x4½	Under hood.	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Cushions
Chase, D	1,000	855	106	Solid	36x2½	36x2½	Under hood.	3	4.125x4.000		2-cycle	Sep			Air	
Chase, K	2,000	1,350	106	Solid	36x2½	36x3	Under hood.	3	4.125x4.000		2-cycle	Sep			Air	
Chase, H	2,000	1,200	106	Solid	36x2½	36x3	Under hood.	3	4.125x4.000		2-cycle	Sep			Air	
Chase, L	3,000	1,675	112	Solid	36x3	36x3½	Under hood.	3	4.500x5.000		2-cycle	Sep			Air	
Chase, J	4,000	2,100	120	Solid	36x3½	36x4	Under hood.	3	4.500x5.000		2-cycle	Sep			Air	
Coleman, B	2,000	1,950	107	Solid	36x3½	36x4	Under seat.	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Coleman, C	4,000	2,400	117	Solid	36x4	36x3½*	Under seat.	4	4.250x5.250	28.90	L-head	Sep	Left	Gear	Pump	Springs
Commerce, Del	1,000	875	104	Solid	32x3½	33x4	Under hood.	4	3.000x4.500	14.40	L-head	Block	Right	Gear	Thermo.	Rigid
Continental	3,000	1,850	110	Solid	36x3	40x3½	Under hood.	4	4.000x	25.60					Pump	
Corbitt, F	2,500	2,000	130	Solid	36x3½	40x4	Under hood.	4	3.750x5.000	22.50	L-head	Block	Left	Gear	Pump	Springs
Couple-Gear, A C†**	12,000	5,600	144	Solid	36x5	36x5*	Under seat.	4	5.750x6.000	53.00	T-head	Sep	Opp	Gear	Pump	Springs
Couple-Gear, A C T†**	12,000	5,550	144	Solid	36x5	36x5*	Under seat.	4	5.750x6.000	53.00	T-head	Sep	Opp	Gear	Pump	Springs
Crown, B	2,000	2,300	135	Solid	34x3½	38x5	Under hood.	4	4.000x5.000	25.60	L-head	Block	Left	Gear	Pump	Springs
Crown, C	4,000	3,000	150	Solid	34x4	38x4*	Under hood.	4	4.250x5.000	28.90	T-head	Pairs	Opp	Gear	Pump	Springs
Croxton, Taxi		1,800	121	Pneu	36x4	36x4	Under hood.	4	4.125x5.500	27.25	L-head	Block	Left	Gear	Thermo.	Springs
Danielson, A	3,000	2,000	115	Solid	36x3½	36x4	Under seat.	4	4.250x4.250	28.90	T-head	Sep	Opp	Gear	Pump	Springs
Dart, B	2,000	1,300	114	Solid	36x3	36x3½	Under hood.	4	4.063x4.500	27.10	L-head	Block	S & H	Gear	Pump	Trunn'ns.
Dart, C	4,000	1,775	130	Solid	34x4	36x4	Under hood.	4	4.125x5.500	27.25	L-head	Block	S & H	Gear	Pump	Trunn'ns.
DeKalb, D-2	4,000	2,600	136-44	Solid	36x4	36x3½*	Under hood.	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Diamond, T. J	3,000	2,250	127-44	Solid	36x3½	36x5	Under hood.	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Diamond, T. G	6,000	3,350	144	Solid	36x5	36x5*	Under hood.	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Diamond, T. G	10,000	3,600	144	Solid	36x6	36x6*	Under hood.	4	5.000x5.500	40.00	L-head	Pairs	Left	Gear	Pump	Springs
Dispatch, 1914	1,200	825	120	Pneu	36x3½	36x3½	Under hood.	4	3.750x5.000	22.50	L-head	Block	Right	Gear	Thermo.	Rigid
Dorris, Del	1,500	2,100	132-44	Pneu	35x4½	35x4½	Under hood.	4	4.375x5.000	30.63	I-head	Pairs	Head	Gear	Pump	Rigid
Dorris, 2-ton	4,000	2,500	148	Solid	34x3½	36x3½*	Under hood.	4	4.375x5.000	30.63	I-head	Pairs	Head	Gear	Pump	Rigid
Fargo, E	1,500	800	86-100	Solid	35x3	35x3	Under body	2	4.500x6.000	16.20	I-head	Sep	Head	Gear	Thermo.	Rigid
Federal, G. H		1,800					Under hood.	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Four Wheel Drive, G**	3,000	3,600	124	Solid	36x4	36x4	Under seat.	4	4.250x5.000	28.90	T-head	Pairs	Opp	Gear	Pump	Trunn'ns.
Four Wheel Drive, B**	6,000	4,000	124	Solid	36x6	36x6	Under seat.	4	4.750x5.500	36.10	T-head	Pairs	Opp	Gear	Pump	Trunn'ns.
Gabriel, K		1,000	106	Solid	32x4	32x4	Under hood.	4	3.500x5.000	19.60	L-head	Block	Left	Gear	Thermo.	Rigid
Gabriel, H		1,500	126	Solid	34x4½	34x4½	Under hood.	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Rigid
Gabriel, L		2,500	154	Solid	36x5	36x5*	Under hood.	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Rigid
Garford, L	4,000	2,800	128	Solid	36x5	40x3½*	Under floor.	4	4.250x5.250	28.90	L-head	Block	Left	Gear	Pump	Springs
Garford, J	6,000	3,500	128	Solid	36x5	40x4*	Under floor.	4	4.250x5.250	28.90	L-head	Block	Left	Gear	Pump	Springs
Garford, K	8,000	3,850	128	Solid	36x5	40x5*	Under floor.	4	4.250x5.250	28.90	L-head	Block	Left	Gear	Pump	Springs
Garford, D	10,000	4,500	128	Solid	36x6	40x6*	Under floor.	4	4.250x5.250	28.90	L-head	Block	Left	Gear	Pump	Springs
Garford, F	12,000	4,850	128	Solid	36x6	40x7*	Under floor.	4	4.250x5.250	28.90	L-head	Block	Left	Gear	Pump	Springs
Gay, F	2,000	1,475	114	Solid			Under hood.	4	3.750x4.500	22.50	L-head	Pairs	Left	Hel'l	Pump	Springs
Gay, G	3,000	1,675	120	Solid	36x3½	36x4	Under hood.	4	4.000x4.500	25.60	L-head	Pairs	Left	Hel'l	Pump	Springs
Geneva, 2	12,000	1,250	96	Solid	34x2	36x2½	Under hood.	2	5.125x4.500	21.00	L-head	Sep	S & H	Gear	Thermo.	Trunn'ns
G. M. C., VC	2,500	1,900	148½	Solid	34x3	36x5	Under hood.	4	3.500x5.250	19.60	L-head	Block	Left	Gear	Pump	Rigid
G. M. C., SC	4,000	2,600	143	Solid	34x4	36x3½*	Under hood.	4	4.000x6.000	25.60	L-head	Block	Left	Gear	Pump	Rigid
G. M. C., H	7,000	3,200	138	Solid	36x5	36x4*	Under seat.	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Ball Joint
G. M. C., HU	7,000	3,500	156	Solid	36x5	42x5*	Under hood.	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Rigid
G. M. C., KU	10,000	4,500	156	Solid	36x6	42x6*	Under hood.	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Rigid
G. M. C., KUL	10,000	4,600	208	Solid	36x6	42x6*	Under hood.	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Rigid
G. M. C., K	10,000	4,250	138	Solid	36x6	36x5*	Under seat.	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Rigid
B. A. Gramm, 1-ton	2,000	1,750	130	Solid	34x3½	36x4	Under hood.	4	4.750x5.250	22.50	L-head	Block	Right	Gear	Pump	Springs
B. A. Gramm, 2-ton	4,000	2,750	128	Solid	36x4	36x3½*	Bet seats.	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
B. A. Gramm, 3½-ton	7,000	3,600	140	Solid	36x5	36x5*	Bet seats.	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
B. A. Gramm, 5-ton	10,000	4,500	168	Solid	36x6	36x6*	Under hood.	6	4.125x5.250	40.90	L-head	Threes	Right	Gear	Pump	Springs
Great Eagle, A			145	Pneu	37x5	37x5	Under hood.	4	4.750x5.000	36.10	T-head	Pairs	Opp	Gear	Pump	Rigid
Great Eagle, D			145	Pneu	37x5	37x5	Under hood.	6	4.500x6.250	48.60	T-head	Pairs	Opp	Gear	Pump	Rigid
Harvey, D	3,000	1,875	130	Solid	34x3½	38x4	Under hood.	4	3.750x5.500	22.50	L-head	Block	Right	Gear	Pump	Trunn'ns.

**Drives on four wheels. †Gas-electric power plant,

ABBREVIATIONS:—Tires: Pneu, pneumatic; *, dual tread. **Motor Location:** Bet Seats, between seats. **Cylinders:** Sep, separately cast. **Valve Location:** Opp, opposite; S & H, side and head. **Camshaft Drive:** Gear, type not known; Hel'l, helical. **Cooling:** Thermo, thermo-syphon. **Radiator Suspension:** S & T, springs and trunnions. **Ingition:** Sing, single; Doub, double; 2-Pt, two point; Auto, automatic; Gov, governed; Opt, optional. **Motor Lubrication:** Spl-pres, splash and pressure. **Clutch:** Exp bd, expanding band; Con bd, contracting band.

Load Capacity and Complete Specifications

IGNITION					TRANSMISSION						RUNNING GEAR				BEARINGS		
						GEARSET					SPRINGS		CONTROL				
													Location				
System	Magneto	Control	Carbureter	Motor Lubrication	Clutch Type	Type	Location	No. Forw'd Speeds	Gear Ratio on High	Final Drive	Front	Rear	Steering	Gear-Shift	Gearset	Rear Axle	NAME AND MODEL
Sing...	Eisemann..	Hand....	Rayfield....	Splash...	Cone..	Sel....	Unit J.	3	7.42–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	Bessemer, C
Sing...	Eisemann..	Hand....	Rayfield....	Splash...	Cone..	Sel....	Unit J.	3	6.50–1	Chain....	½ Ell...	½ Plat.	Left...	Center.	Ball...	Roll...	Bessemer, B
Sing...	Eisemann..	Hand....	Rayfield....	Splash...	Cone..	Sel....	Unit J.	3	6.50–1	Chain....	½ Ell...	½ Plat.	Left...	Center.	Ball...	Roll...	Bessemer, A
Doub..	Remy.....	Gov.....	Marvel.....	Spl-Pres..	.....	Fric...	Amid..	.....	.....	Chain....	½ Ell...	Ell....	Left...	Left...	Roll...	Roll...	Best, A
Doub..	Remy.....	Hand....	Marvel.....	Splash...	Cone..	Sel....	Amid..	3	.....	Bevel....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Ball...	Best, C
Sing..	Bosch.....	Fixed....	.....	Splash...	Cone..	Sel....	Amid..	3	..... :	T Worm.	½ Ell...	½ Ell...	Right..	Right..	.....	B & R.	Blair, C
Dual...	Bosch.....	Fixed....	.....	Splash...	Cone..	Sel....	Amid..	3	.....	T Worm.	½ Ell...	½ Ell...	Right..	Right..	Ball...	B & R.	Blair, D
Dual...	Bosch.....	Fixed....	.....	Splash...	Cone..	Sel....	Amid..	3	.....	T Worm.	½ Ell...	½ Ell...	Right..	Right..	.....	B & R.	Blair, E
Dual...	Mea.....	Hand....	Excelsior...	Splash...	Disk...	Sel....	Unit M.	3	.....	Int G....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	Brown
Dual...	Briggs.....	Hand....	Excelsior...	Spl-Pres.	.....	Fric....	.....	.....	3.60–1	Chain....	½ Ell...	Ell....	Right..	Right..	.....	Ball...	Buckeye, V-1
Dual...	Briggs.....	Hand....	Schebler....	Splash...	.....	Fric....	.....	.....	3.00–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	.....	Ball...	Buckeye, V-2
Dual...	Briggs.....	Hand....	Rayfield....	Spl-pres.	.....	Fric....	.....	.....	3.00–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	.....	Roll...	Buckeye, V-4
Dual...	Briggs.....	Hand....	Rayfield....	Spl-Pres.	.....	Fric....	.....	.....	3.00–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	.....	Roll...	Buckeye, V-5
Dual...	Remy.....	Hand....	Marvel.....	Splash...	Cone..	Sel....	Amid..	3	.....	Bevel....	½ Ell...	Ell....	Left...	Center.	Ball...	B & R.	Buick, 3
Dual...	Remy.....	Hand....	Marvel.....	Splash...	Cone..	Sel....	Amid..	3	.....	Bevel....	½ Ell...	Ell....	Left...	Center.	Ball...	B & R.	Buick, 4
Sing...	Bosch.....	Hand....	Stromberg..	Splash...	Disk...	Sel....	Amid..	3	5.06–1	Bevel....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	Butler, 1914
Sing...	Bosch.....	.....	Holley.....	In fuel...	.....	Plan...	Amid..	2	3.00–1	Chain....	Ell....	Ell....	Right..	Right..	.....	Ball...	Chase, D
Sing...	Bosch.....	.....	Holley.....	In fuel...	Disk...	Sel....	Amid..	3	7.80–1	Chain....	Ell....	Plat...	Right..	Right..	Roll...	Ball...	Chase, K
Sing...	Bosch.....	.....	Holley.....	In fuel...	.....	Plan...	Amid..	2	3.00–1	Chain....	Ell....	Plat...	Right..	Right..	Ball...	Ball...	Chase, H
Sing...	Bosch.....	.....	Holley.....	In fuel...	Disk...	Sel....	Unit M.	3	8.60–1	Chain....	Ell....	Plat...	Right..	Right..	Roll...	Roll...	Chase, L
Sing...	Bosch.....	.....	Holley.....	In fuel...	Disk...	Sel....	Unit M.	3	8.60–1	Chain....	Ell....	Plat...	Right..	Right..	Roll...	Roll...	Chase, J
Dual...	Remy.....	Hand....	Schebler....	Spl-Pres..	Cone..	Sel....	Unit J.	3	.....	Chain....	Ell....	Ell....	Right..	.....	Roll...	Roll...	Coleman, B
Dual...	Remy.....	Hand....	Schebler....	Splash...	Cone..	Sel....	Unit J.	3	.....	Chain....	Ell....	Plat...	Right..	Right..	Roll...	Roll...	Coleman, C
Sing...	Bosch.....	Fixed....	Holley.....	Splash...	.....	Fric....	.....	.....	.....	Chain....	½ Ell...	½ Ell...	Left...	Left...	.....	Roll...	Commerce, Del
Dual...	Bosch.....	.....	.....	.....	Cone..	Sel....	.....	3	8.25–1	Chain....	½ Ell...	Plat...	.....	.....	.....	.....	Continental
Sing...	Bosch.....	Hand....	Stromberg..	Splash...	Disk...	Sel....	Amid..	3	8.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Ball...	Corbitt, F
Dual...	Mea.....	Hand....	Stromberg..	Spl-Pres.	.....	.....	.....	.....	.....	Int G....	½ Ell...	½ Ell...	Right..	.....	.....	Roll...	Couple-Gear, A C†**
Dual...	Mea.....	Hand....	Stromberg..	Spl-Pres.	.....	.....	.....	.....	.....	Int G....	½ Ell...	½ Ell...	Right..	.....	.....	Roll...	Couple-Gear, A C T†**
Sing...	Bosch.....	Fixed....	Stromberg..	Pressure.	Cone..	Sel....	Amid..	4	.....	T Worm.	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	Crown, B
Sing...	Bosch.....	Fixed....	Stromberg..	Pressure.	Cone..	Sel....	Amid..	4	.....	T Worm.	½ Ell...	½ Ell...	Left]...	Center.	Ball...	Ball...	Crown, C
Sing...	Eisemann..	Auto.....	Planhard...	Splash...	Disk...	Sel....	Amid..	3	.....	Bevel....	½ Ell...	¾ Ell...	Left...	Center.	Plain..	Ball...	Croxton, Taxi
Doub..	Bosch.....	Hand....	Schebler....	Splash...	Cone..	Sel....	Unit J.	3	.....	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Ball...	Danielson, A
Sing...	Eisemann..	.....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	.....	Chain....	.....	.....	Left...	Center.	.....	.....	Dart, B
Sing...	Eisemann..	Fixed....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	.....	Chain....	½ Ell...	½ Ell...	Left...	Center.	.....	.....	Dart, C
Sing...	Bosch.....	Fixed....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	7.13–1	Chain....	½ Ell...	½ Ell..	Left...	Center.	Roll...	Roll...	DeKalb, D-2
Sing...	Bosch.....	Fixed....	Rayfield....	Spl-Pres.	Disk...	Sel....	Unit M.	3	.....	T Worm.	½ Ell...	½ Ell...	Right..	Center.	Roll...	Roll...	Diamond, T J
Dual...	Bosch.....	Hand....	Rayfield....	Spl-Pres.	Disk...	Sel....	Amid..	3	.....	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	Diamond, T G
Dual...	Bosch.....	Hand....	Rayfield....	Spl-Pres.	Disk...	Sel....	Amid..	3	.....	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	Diamond, T G
Dual...	Splitdorf...	Hand....	Zenith.....	Pressure.	Disk...	Fric....	Amid..	.....	4.00–1	Chain....	Ell....	Ell....	Right..	Center.	Ball...	Ball...	Dispatch, 1914
Sing...	Bosch.....	Hand....	Flechter	Splash...	Disk...	Sel....	Unit M.	3	4.93–1	Bevel....	½ Ell...	¾ Plat.	Left...	Center.	Roll...	Roll...	Dorris, Del
Dup'x.	Bosch.....	Hand....	Flechter ...	Splash...	Disk...	Sel....	Unit M.	3	7.65–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	Dorris, 2-ton
Dual...	Lutz.....	Hand....	Holley.....	Splash...	.....	Fric....	Amid..	.....	4.00–1	Bevel....	½ Ell...	Plat...	Left...	Left...	.....	Roll...	Fargo, E
Sing...	Eisemann..	Fixed....	Stromberg..	Splash...	Cone..	Sel....	Unit J.	3	7.09–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Roll...	Federal, G H
Sing...	Bosch.....	Hand....	Stromberg..	Spl-Pres.	Disk...	Ind C..	Amid..	3	9.79–1	.....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Ball...	Four Wheel Drive, G**
Sing...	Bosch.....	Hand....	Stromberg..	Spl-Pres.	Disk...	Ind C..	Amid..	3	8.90–1	.....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Ball...	Four Wheel Drive, B**
Sing...	Bosch.....	Hand....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	4.00–1	Bevel....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Ball...	Gabriel, K
Sing...	Bosch.....	Hand....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	4.25–1	Bevel....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Roll...	Gabriel, H
Sing...	Bosch.....	Hand....	Stromberg..	Splash...	Cone..	Sel....	Amid..	4	5.50–1	Bevel....	½ Ell...	½ Ell...	Left...	Center.	Roll...	Roll...	Gabriel, L
Dual...	Bosch.....	Hand....	Own.....	Spl-Pres.	Cone..	Sel....	Amid..	3	9.17–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	Garford, L
Dual...	Bosch.....	Hand....	Own.....	Spl-Pres.	Cone..	Sel....	Amid..	3	10.74–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	Garford, J
Dual...	Bosch.....	Hand....	Own.....	Spl-Pres.	Cone..	Sel....	Amid..	3	10.74–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Roll...	Roll...	Garford, K
Dual...	Bosch.....	Hand....	Own.....	Spl-Pres.	Cone..	Sel....	Amid..	4	13.31–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Roll...	Garford, D
Dual...	Bosch.....	Hand....	Own.....	Spl-Pres.	Cone..	Sel....	Amid..	4	15.63–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Roll...	Garford, F
Sing...	Eisemann..	Fixed....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	6.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	Gay, F
Sing...	Eisemann..	Fixed....	Stromberg..	Splash...	Cone..	Sel....	Amid..	3	7.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	Gay, G
Sing...	Bosch.....	Fixed....	Schebler....	Spl-Pres..	Disk...	Plan...	Unit J.	2	8.00–1	Chain....	½ Ell...	Ell....	Right..	.....	Ball...	Ball...	Geneva, 2
Sing...	Bosch.....	Hand....	Kingston...	Splash...	Cone..	Sel....	Amid..	3	8.65–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	G. M. C., VC
Sing...	Bosch.....	Hand....	Kingston...	Splash...	Cone..	Sel....	Amid..	3	8.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	G. M. C., SC
Doub..	Mea.....	Hand....	Holley.....	Splash...	Disk...	Prog...	Amid..	3	7.76–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Roll...	G. M. C., H
Doub..	Mea.....	Hand....	Holley.....	Splash...	Disk...	Prog...	Amid..	3	9.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	G. M. C., HU
Doub..	Mea.....	Hand....	Holley.....	Splash...	Disk...	Prog...	Amid..	3	12.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	G. M. C., KU
Doub..	Mea.....	Hand....	Holley.....	Splash...	Disk...	Prog...	Amid..	3	12.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	G. M. C., KUL
Doub..	Mea.....	Hand....	Holley.....	Splash...	Disk...	Prog...	Amid..	3	10.25–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Roll...	G. M. C., K
Sing...	Bosch.....	Hand....	Schebler....	Splash...	Cone..	Sel....	Amid..	3	7.00–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	B. A. Gramm, 1-ton
Dup'x.	Bosch.....	Hand....	Schebler....	Splash...	Disk...	Ind C..	Amid..	3	8.30–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Roll...	B. A. Gramm, 2-ton
Dup'x.	Bosch.....	Hand....	Schebler....	Splash...	Disk...	Ind C..	Amid..	4	9.40–1	Chain....	½ Ell...	½ Ell...	Right..	Right..	Ball...	Roll...	B. A. Gramm, 3½-ton
Dual...	Bosch.....	Hand....	Schebler....	Splash...	Disk...	Ind C..	Amid..	4	11.90–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Roll...	B. A. Gramm, 5-ton
Doub..	Eisemann..	Hand....	Rayfield....	.....	Cone..	Sel....	Amid..	3	.....	Bevel....	½ Ell...	Plat...	Left...	Left...	Roll...	Ball...	Great Eagle, A
Doub..	Eisemann..	Hand....	Rayfield....	.....	Cone..	Sel....	Amid..	3	.....	Bevel....	½ Ell...	Plat...	Left...	Left...	Roll...	Ball...	Great Eagle, D
Sing...	Eisemann..	Auto.....	Holley.....	Splash...	Cone..	Sel....	Unit J.	3	8.20–1	Chain....	½ Ell...	½ Ell...	Left...	Center.	Ball...	Ball...	Harvey, D

ABBREVIATIONS:—Gearset: Sel, selective; Prog, progressive; Plan, planetary; Fric, friction; Ind C, individual clutch. **Gearset Location:** Amid, amidships; Unit M, unit with the motor. Unit J, unit with the jackshaft; Unit X, unit with the rear axle. **Final Drive:** Int G, internal gear; Bevel, shaft with bevel; T Worm, shaft with top worm; Chain, by chain to the rear wheels; **Springs:** ½Ell, semi-elliptic; Ell, elliptic; ¾Ell, ¾ elliptic; Plat, platform. **Bearings:** Roll, roller; B & R, ball and roller; Opt, optional.

Gasoline Truck Chassis on the 1914 Market

NAME AND MODEL	Load Capacity, Pounds	Chassis Price	Wheel-base, Inches	TIRES			Motor Location	No. Cylinders	Bore and Stroke, Inches	S. A. E. H. P	CYLINDERS		Valve Location	Camshaft Drive	COOLING	
				Kind	Front	Rear					Shape	How Cast			Circulation	Radiator Suspension
Horner, 1-ton	2,000	2,000	145	Solid	34x3½	34x4	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Bumper
Horner, 2-ton	4,000	2,650	145	Solid	36x4	36x3½*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Bumper
Horner, 1½-ton	3,000	2,250	145	Solid	36x4	36x4	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Bumper
Horner, 3-ton	6,000	3,200	145	Solid	36x5	40x4*	Under hood	4	4.500x3.500	32.40	L-head	Pairs	Left	Gear	Pump	Bumper
Horner, 5-ton	10,000	4,200	156	Solid	38x6	42x6*	Under hood	4	5.250x5.750	44.10	T-head	Pairs	Opp	Gear	Pump	Bumper
Hupmobile, 32	800		106	Pneu	32x4	33x4	Under hood	4	3.250x5.500	16.90	L-head	Block	Left	Chain	Thermo	Rigid
Ideal, I	2,000	1,500	115	Solid	36x3	36x3½	Under seat	4	3.750x4.500	22.50	L-head	Block	Left	Gear	Thermo	Springs
Ideal, H-2	3,000	2,000	124	Solid	36x3½	36x4	Under seat	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Ideal, K	5,000	2,500	134	Solid	36x4	36x3½	Under seat	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
International, MW	1,000		90	Solid	-x2	-x2	Under body	2	4.500x5.000	16.20	I-head	Sep	Head	Gear	Pump	Springs
International, MA	1,000		90	Solid	-x2	-x2	Under body	2	5.000x5.000	20.00	I-head	Sep	Head	Gear	Air	
Jeffery, 1514	1,500		120	Pneu	34x4½	34x4½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Hel'l	Pump	Springs
Jeffery, 2014**	2,000		130	Solid	34x3½	34x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Hel'l	Pump	Springs
Kalamazoo, B	3,000	1,590	110	Solid	36x3	36x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Kearns, A	1,500	850	100	Solid	36x2	36x2½	Under hood	4	3.500x4.000	19.60	L-head	Pairs	Right	Chain	Pump	Trunn'ns
Kelly, K-30	2,000	2,000	120-44	Solid	36x3½	36x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Right	Gear	Pump	Springs
Kelly, K-40	6,000		150-72	Solid	38x5	42x5*	Under hood	4	4.500x6.500	32.40	T-head	Pairs	Opp	Gear	Pump	Springs
King, 3	7,000	3,350	120	Solid	36x6	36x4*	Under floor	4	4.500x5.500	32.40	L-head	Pairs	Left	Hel'l	Pump	Springs
Kisselkar, ¾-ton	1,500	1,500	125	Pneu	34x4½	34x4½	Under hood	4	4.250x5.250	28.90	L-head	Pairs	Left	Chain	Pump	Springs
Kisselkar, 1-ton	2,000	1,850	140	Pneu	37x5	37x5	Under hood	4	4.500x5.250	32.40	L-head	Pairs	Left	Chain	Pump	Springs
Kisselkar, 1½-ton	3,000	2,100	132	Solid	34x3½	38x5	Under hood	4	4.250x5.250	28.90	L-head	Pairs	Left	Chain	Pump	Springs
Kisselkar, 2½-ton	5,000	2,750	144	Solid	36x4	38x4*	Under hood	4	4.500x5.250	32.40	L-head	Pairs	Left	Chain	Pump	Springs
Kisselkar, 3½-ton	7,000	3,350	162	Solid	36x5	40x5*	Under hood	4	4.875x5.000	38.00	L-head	Pairs	Left	Chain	Pump	Springs
Kisselkar, 6-ton	12,000	4,350	168	Solid	36x6	40x6*	Under hood	4	4.875x5.000	38.00	L-head	Pairs	Left	Chain	Pump	Springs
Knickerbocker, 3-ton	6,000	3,750	120	Solid			Under seat	4	4.500x5.500	32.40	T-head	Pairs	Opp	Gear	Pump	Springs
Knickerbocker, 4-ton	8,000	4,000	120	Solid			Under seat	4	4.500x5.500	32.40	T-head	Pairs	Opp	Gear	Pump	Springs
Knickerbocker, 5-ton	10,000	4,500	134	Solid			Under seat	4	4.500x5.500	32.40	T-head	Pairs	Opp	Gear	Pump	Springs
Knox, R-3	4,000	3,000	145	Solid	34x4	34x4*	Under hood	4	5.000x5.500	40.00	I-head	Sep	Head	Gear	Pump	Springs
Knox, Tractor	20,000	3,250	139	Solid	34x5	36x5*	Under hood	4	5.000x5.500	40.00	I-head	Sep	Head	Gear	Pump	Springs
Knox, Tractor	40,000	3,750	140	Solid	34x5	36x6*	Under hood	4	5.000x5.500	40.00	I-head	Sep	Head	Gear	Pump	Springs
Knox, Combination		4,100	145	Solid	40x5½	40x5½	Under hood	4	5.500x5.500	48.04	I-head	Sep	Head	Gear	Pump	Springs
Koehler, 1-ton	2,000	725	90	Solid	36x2½	36x2½	Under body	2	5.250x4.000	22.00	L-head	Sep	Side	Gear	Thermo	Springs
Kosmath, 1914	1,000	850	110	Pneu	32x3½	32x3½	Under hood	4	3.500x4.000	19.60	L-head	Pairs	Left	Gear	Pump	Springs
Krebs, E	1,000	950	100	Pneu	32x3½	32x3½	Under hood	4	3.500x4.000	19.60	L-head	Pairs	Left	Gear	Pump	Cushion
Krebs, BB	1,500	1,425	100	Pneu	34x4	34x4	Under hood	4	3.750x4.500	22.50	L-head	Block	Right	Gear	Thermo	Cushions
Krebs, AA	2,000	1,425	100	Solid	34x3	34x3	Under hood	4	3.750x4.500	22.50	L-head	Block	Right	Gear	Thermo	Cushions
Krebs, D & DD	3,000	1,775	118-44	Solid	36x3½	36x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Right	Gear	Thermo	Cushions
LaFrance, 6-ton	12,000	5,500	144	Solid	36x5	38x6*	Bet seats	4	5.500x6.000	48.40	T-head	Pairs	Opp	Gear	Pump	Springs
Landshaft, C	1,500	1,000	117	Solid	34x2½	36x2½	Under hood	4	3.000x4.500	14.40	L-head	Block	Right	Gear	Thermo	Springs
Landshaft, J	3,000	1,800	134	Solid	34x3½	36x4	Under hood	4	4.125x5.250	27.25	L-head	Block	Right	Gear	Pump	Springs
Lange, C	2,000	2,250	125	Solid	36x3½	38x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Hel'l	Thermo	Springs
Lange, B	4,000	3,000	136	Solid	36x4	38x3*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Hel'l	Thermo	Springs
Lauth-Juergens, K	2,000	2,100	Opt	Opt	Opt	Opt		4	3.800x5.300	23.25	L-head	Block	Left	Gear	Pump	Springs
Lauth-Juergens, L	4,000	2,800	Opt	Opt	Opt	Opt		4	3.800x5.300	23.25	L-head	Block	Left	Gear	Pump	Springs
Lauth-Juergens, M	6,000	3,450	Opt	Opt	Opt	Opt		4	4.800x5.000	37.00	L-head	Sep	Left	Gear	Pump	Springs
Lewis, 21	5,000	3,250	144	Solid	34x4	36x3½*	Optional	4	4.250x5.000	28.90	T-head	Pairs	Opp	Gear	Pump	S & T
Lewis, 2.S	6,000	3,500	144	Solid	34x4	36x4*	Optional	4	4.250x5.000	28.90	T-head	Pairs	Opp	Gear	Pump	S & T
Lewis, 51	10,000	4,750	144	Solid	36x6	38x6*	Under seat	4	4.750x5.500	36.10	T-head	Pairs	Opp	Gear	Pump	S & T
Light, 800 lbs	800		66	Pneu	26x3	26x3		2	3.500x3.670	9.80		Sep		Gear	Air	
Lippard-Stewart, C	1,500	1,650	125	Pneu	35x4½	35x4½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Lippard-Stewart, F	3,000	2,300	145-58	Solid	36x3½	36x3*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Little-Giant, F	2,000	1,200	110	Solid	-x2½	-x3	Under seat	2	5.000x4.000	20.00	L-head	Sep	S & H	Gear	Thermo	Rigid
Little-Giant, H	2,000	1,350	110	Solid	-x3	-x3½	Under floor	4	3.750x5.500	22.50	L-head	Block	Right	Gear	Thermo	Springs
Locomobile, A	10,000	4,800	140-70	Solid	40x6	40x6*	Under seat	4	5.000x6.000	40.00	T-head	Pairs	Opp	Gear	Pump	Springs
Longest, 3-A	8,000	4,000	144-72	Solid	36x5	36x5*	Under hood	4	5.000x5.500	40.00	T-head	Pairs	Opp	Gear	Pump	Springs
Lord Baltimore, B	2,000	1,800	128	Solid	34x3½	36x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Trunn'ns
Lord Baltimore, D	4,000	2,300	142	Solid	34x4	36x3*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Trunn'ns
Maccarr, A	1,500	1,650	120-32	Pneu	36x4½	36x4½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Maccarr, B	2,000	1,900	Opt	Solid	36x4	36x5	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Maccarr, C	3,000	2,150	Opt	Solid	36x4	36x6	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Mack, 1-ton	2,000	2,000	Opt	Opt	Opt	Opt	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Chain	Pump	Rigid
Mack, 5-ton	10,000	4,000	Opt	Opt	Opt	Opt	Under hood	4	5.500x6.000	48.40	L-head	Pairs	Left	Chain	Pump	Rigid
Mais, C	3,000	2,750	119	Solid	36x4	36x5	Under hood	4	4.000x5.250	25.60	T-head	Pairs	Opp	Gear	Pump	Springs
Mais, D	3,000	2,800	132	Solid	36x4	36x5	Under hood	4	4.000x5.250	25.60	T-head	Pairs	Opp	Gear	Pump	Springs
Mais, E	4,000	2,950	132	Solid	36x4	36x4*	Under hood	4	4.000x5.250	25.60	T-head	Pairs	Opp	Gear	Pump	Springs
Mais, F	4,000	3,000	145	Solid	36x4	36x4*	Under hood	4	4.000x5.250	25.60	T-head	Pairs	Opp	Gear	Pump	Springs
Mais, G	5,000	3,200	145	Solid	36x4	36x4*	Under hood	4	4.315x5.250	29.76	T-head	Pairs	Opp	Gear	Pump	Springs
Mais, H	6,000	3,400	160	Solid	36x5	36x5*	Under hood	4	4.315x5.250	29.76	T-head	Pairs	Opp	Gear	Pump	Springs
Marmon, Delivery	1,500	2,500	120		32x4	32x4	Under hood	4	4.000x5.000	25.60	T-head	Pairs	Opp	Hel'l	Pump	Trunn'n
Martin, B	3,000		140	Solid	36x3½	40x4	Under hood	4	4.250x5.000	28.90	T-head	Pairs	Opp	Hel'l	Pump	Springs
Martin, S	3,000		121	Solid	36x3½	40x4	Under seat	4	4.000x5.000	25.60	L-head	Block	Side	Hel'l	Pump	Springs

**Drives on four wheels.

ABBREVIATIONS:—Tires: Pneu, pneumatic; *, dual tread. **Motor Location:** Bet Seats, between seats. **Cylinders:** Sep, separately cast. **Valve Location:** Opp, opposite; S & H, side and head. **Camshaft Drive:** Gear, type not known; Hel'l, helical. **Cooling:** Thermo, thermo-syphon. **Radiator Suspension:** S & T, springs and trunnions. **Ingition:** Sing, single; Doub, double; 2-Pt, two point; Auto, automatic; Gov, governed; Opt, optional. **Motor Lubrication:** Spl-pres, splash and pressure. **Clutch:** Exp bd, expanding band; Con bd, contracting band.

Load Capacity and Complete Specifications

IGNITION			Carbureter	Motor Lubrication	TRANSMISSION						RUNNING GEAR				BEARINGS		NAME AND MODEL
						GEARSET					SPRINGS		CONTROL				
System	Magneto	Control			Clutch Type	Type	Location	No. Forw'd Speeds	Gear Ratio on High	Final Drive	Front	Rear	Location Steering	Gear-Shift	Gearset	Rear Axle	
Dual	Mea	Gov	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	6.80-1	Chain	½ Ell	Plat	Left	Center	Roll	Roll	Horner, 1-ton
Dual	Mea	Gov	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	9.43-1	Chain	½ Ell	Plat	Left	Center	Roll	Roll	Horner, 2-ton
Dual	Mea	Gov	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	7.79-1	Chain	½ Ell	Plat	Left	Center	Roll	Roll	Horner, 1½-ton
Dual	Mea	Gov	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	9.40-1	Chain	½ Ell	Plat	Left	Center	Roll	Roll	Horner, 3-ton
Dual	Mea	Gov	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	13.42-1	Chain	½ Ell	Plat	Left	Center	Roll	Roll	Horner, 5-ton
Sing	Bosch	Hand	Zenith	Spl-Pres	Disk	Sel	Unit M.	3	3.86-1	Bevel	½ Ell	Cross	Right	Center	B & R	Roll	Hupmobile, 32
Sing	Eisemann	Hand	Schebler	Spl-Pres	Cone	Sel	Amid	3	6.70-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Ball	Ideal, I
Dual	Eisemann	Hand	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	6.70-1	Chain	½ Ell	¾ Plat	Right	Right	Roll	Roll	Ideal, H-2
Dual	Eisemann	Hand	Stromberg	Spl-Pres	Disk	Sel	Unit M.	3	7.40-1	Chain	½ Ell	¾ Plat	Right	Right	Roll	Roll	Ideal, K
Doub	Heinze	Hand	Schebler	Spl-Pres	Con Bd			2		Chain	Ell	Ell	Right	Right	Roll	Roll	International, MW
Doub	Heinze	Hand	Schebler	Spl-Pres	Con Bd			2		Chain	Ell	Ell	Right	Right	Roll	Roll	International, MA
Dup'x	Bosch	Hand	Rayfield	Spl-Pres	Disk	Sel	Amid	3	4.00-1	Bevel	½ Ell	½ Ell	Right	Right	Roll	Roll	Jeffery, 1514
Dup'x	Bosch	Hand	Rayfield	Spl-Pres	Disk	Sel	Amid	3	6.08-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Jeffery, 2014**
Sing	Bosch	Fixed	Kingston	Splash	Cone	Sel	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Kalamazoo, B
Doub	Remy	Hand	Schebler	Splash		Fric				Chain	Ell	Ell	Right	Right	Roll	Ball	Kearns, A
Sing	Eisemann	Auto	Breeze	Spl-Pres	Cone	Sel	Amid	3	8.60-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Kelly, K-30
Sing	Eisemann	Auto	Schebler	Spl-Pres	Cone	Sel	Amid	3	11.60-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Kelly, K-40
Dual	Bosch	Fixed	Schebler	Spl-Pres	Disk	Ind C	Unit J	3	10.72-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	King, 3
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	5.00-1	Bevel	½ Ell	½ Ell	Left	Center	B & R	Roll	Kisselkar, ½-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	5.00-1	Bevel	½ Ell	½ Ell	Right	Right	B & R	Roll	Kisselkar, 1-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	4	8.07-1	Chain	½ Ell	½ Ell	Left	Center	B & R	Roll	Kisselkar, 1½-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	4	9.95-1	Chain	½ Ell	½ Ell	Left	Center	B & R	Roll	Kisselkar, 2½-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	4	11.00-1	Chain	½ Ell	½ Ell	Left	Center	B & R	Roll	Kisselkar, 3½-ton
Sing	Bosch	Hand	Stromberg	Spl-Pres	Cone	Sel	Amid	4	12.70-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Kisselkar, 6-ton
Dual	Bosch	Hand	Stromberg	Spl-Pres	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Left	B & R	Roll	Knickerbocker, 3-ton
Dual	Bosch	Hand	Stromberg	Spl-Pres	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Left	B & R	Roll	Knickerbocker, 4-ton
Dual	Bosch	Hand	Stromberg	Spl-Pres	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Left	B & R	Roll	Knickerbocker, 5-ton
Doub	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit M.	3	5.34-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Knox, R-3
Doub	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit M.	3	10.95-1	Chain	½ Ell	Cant	Right	Center	Ball	Roll	Knox, Tractor
Doub	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Amid	3	12.11-1	Chain	½ Ell	Cant	Right	Center	Ball	Roll	Knox, Tractor
Doub	Bosch	Hand	Scott	Pressure	Disk	Sel	Unit M.	3	5.34-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Knox, Combination
Sing	Bosch	Fixed	Schebler	Pressure	Cone	Plan	Amid	2	7.00-1	Chain	½ Ell	Ell	Left	Center	Plain	Plain	Koehler, 1-ton
Sing	Swiss	Fixed	Opt	Splash	Cone	Sel	Unit M.	3	4.00-1	Bevel	½ Ell	Ell	Left	Center	B & R	Roll	Kosmath, 1914
Sing	Bosch	Hand	Kingston	Splash	Cone	Sel	Unit M.	3	4.00-1	Bevel	½ Ell	½ Ell	Left	Center	B & R	B & R	Krebs, E
Sing	Bosch	Auto	Schebler	Splash	Cone	Sel	Amid	3	4.00-1	Bevel	½ Ell	½ Ell	Left	Center	Roll	Ball	Krebs, BB
Sing	Bosch	Auto	Schebler	Splash	Cone	Sel	Amid	3	6.40-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Ball	Krebs, AA
Sing	Bosch	Auto	Schebler	Splash	Cone	Sel	Amid	3	7.80-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Krebs, D & DD
2-Pt	Bosch	Hand	Schebler	Spl-Pres		Hyd				Chain	½ Ell	½ Ell	Right			Roll	LaFrance, 6-ton
Dual	Remy	Hand	Schebler	Splash	Disk	Plan	Amid	2	7.00-1	Chain	½ Ell	Plat	Right	Right	B & R	Ball	Landshaft, C
Dual	Bosch	Hand	Rayfield	Splash	Cone	Sel	Amid	3	7.00-1	Chain	½ Ell	Plat	Right	Right	Roll	Roll	Landshaft, J
Doub	Connect	Hand	Stromberg	Spl-Pres	Disk	Ind C	Amid	3		Chain	½ Ell	½ Ell	Left	Center	B & R	Roll	Lange, C
Doub	Connect	Hand	Stromberg	Spl-Pres	Disk	Ind C	Amid	3		Chain	½ Ell	½ Ell	Left	Center	B & R	Roll	Lange, B
Doub	Opt	Hand	Stromberg	Splash	Disk	Sel	Amid	4		Chain	½ Ell	½ Ell	Right	Right	Ball	Ball	Lauth-Juergens, K
Doub	Opt	Hand	Stromberg	Splash	Disk	Sel	Amid	4		Chain	½ Ell	½ Ell	Left		Ball	Ball	Lauth-Juergens, L
Doub		Hand	Stromberg	Splash	Disk	Sel	Amid	4	9.40-1	Chain	½ Ell	½ Ell	Right	Right	Plain	Ball	Lauth-Juergens, M
Dual	Bosch		Rayfield	Splash	Disk	Sel	Amid	3	8.25-1	Chain	½ Ell	Plat	Right	Right	B & R	Roll	Lewis, 21
Dual	Bosch		Rayfield	Splash	Disk	Sel	Amid	3	8.25-1	Chain	½ Ell	Plat	Right	Right	B & R	Roll	Lewis, 21S
Dual	Bosch	Hand	Rayfield	Splash	Disk	Sel	Amid	3	9.45-1	Chain	½ Ell	Plat	Right	Right	B & R	Roll	Lewis, 51
				Splash						Roller	½ Ell	½ Ell		Pedal			Light, 800 lbs
Sing	Eisemann	Fixed	Rayfield	Spl-Pres	Cone	Sel	Amid	3	5.00-1	Bevel	½ Ell	½ Ell	Left	Center	Roll	Roll	Lippard-Stewart, C
Sing	Eisemann	Fixed	Rayfield	Spl-Pres	Cone	Sel	Amid	3	7.75-1	T Worm	½ Ell	½ Ell	Left	Center	Roll	Roll	Lippard-Stewart, F
Dual	Kingston	Hand	Holley	Spl-Pres	Disk	Sel	Amid	3	7.20-1	Chain	¾ Ell	Ell	Left	Center	Ball	Ball	Little-Giant, F
Dual	Kingston	Hand	Holley	Splash	Disk	Sel	Amid	3	7.20-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Little-Giant, H
Dual	Bosch	Fixed	Own	Spl-Pres	Disk	Sel	Amid	4	10.40-1	Chain	½ Ell	½ Ell	Right	Right	B & R	Roll	Locomobile, A
Dual	Bosch	Hand	Schebler	Pressure	Cone	Sel	Amid	4		Chain	½ Ell	½ Ell	Right	Right	Plain	Roll	Longest, 3-A
Sing	Eisemann	Fixed	Schebler		Disk	Sel	Unit M.	3		Int G	½ Ell	½ Ell	Left	Center			Lord Baltimore, B
Sing	Eisemann	Fixed	Schebler		Disk	Sel	Unit M.	3		Int G	½ Ell	½ Ell	Left	Center			Lord Baltimore, D
Doub	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit M.	3		Worm	½ Ell	½ Ell	Left	Center		Roll	Maccarr, A
Doub	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit M.	3		Worm	½ Ell	½ Ell	Left	Center		Roll	Maccarr, B
Doub	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit M.	3		Worm	½ Ell	½ Ell	Left	Center		Roll	Maccarr, C
Dual	Bosch	Hand	Hoyt	Pressure	Disk	Sel	Amid	3	5.50-1	Chain	½ Ell	Plat	Left	Center	B & R	Roll	Mack, 1-ton
Dual	Bosch	Hand	Breeze	Spl-Pres	Cone	Sel	Amid	3	9.20-1	Chain	½ Ell	Plat	Right	Right	B & R	Roll	Mack, 5-ton
Sing	Eisemann	Auto	Rayfield		Exp Bd	Prog				Opt	Int G	½ Ell	½ Ell	Left			Mais, C
Sing	Eisemann	Auto	Rayfield		Exp Bd	Prog				Opt	Int G	½ Ell	½ Ell	Left			Mais, D
Sing	Eisemann	Auto	Rayfield		Exp Bd	Prog				Opt	Int G	½ Ell	½ Ell	Left			Mais, E
Sing	Eisemann	Auto	Rayfield		Exp Bd	Prog				Opt	Int G	½ Ell	½ Ell	Left			Mais, F
Sing	Eisemann	Auto	Rayfield		Exp Bd	Prog				Opt	Int G	½ Ell	½ Ell	Left			Mais, G
Sing	Eisemann	Auto	Rayfield		Exp Bd	Prog				Opt	Int G	½ Ell	½ Ell	Left			Mais, H
Dual	Bosch	Hand	Stromberg	Pressure	Cone	Sel	Unit X	3	5.00-1	Bevel	½ Ell	Ell	Right	Right	Ball	Ball	Marmon, Delivery
2-Pt	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit J	3	6.75-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Martin, B
Doub		Hand		Pressure	Disk	Sel	Unit J	3	7.95-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Martin, S

ABBREVIATIONS:—Gearset: Sel, selective; Prog, progressive; Plan, planetary; Fric, friction; Ind C, individual clutch; Hyd, hydraulic. **Gearset Location:** Amid, amidships; Unit M, unit with the motor; Unit J, unit with the jackshaft; Unit X, unit with the rear axle. **Final Drive:** Int G, internal gear; Bevel, shaft with bevel; T Worm, shaft with top worm; Chain, by chain to the rear wheels. **Springs:** ½Ell, semi-elliptic; Ell, elliptic; ¾Ell, ¾ elliptic; Plat, platform. **Bearings:** Roll, roller; B & R, ball and roller; Opt, optional.

Gasoline Truck Chassis on the 1914 Market

NAME AND MODEL	Load Capacity, Pounds	Chassis Price	Wheel-base, Inches	TIRES			Motor Location	No. Cylinders	Bore and Stroke, Inches	S. A. E. H. P	CYLINDERS		Valve Location	Camshaft Drive	COOLING	
				Kind	Front	Rear					Shape	How Cast			Circulation	Radiator Suspension
Martin, A	4,000	.....	155	Solid...	36x4	40x3½*	Under hood.	4	4.750x5.500	36.10	T-head...	Pairs.....	Opp.....	Hel'l.....	Pump....	Springs ..
Martin, E	5,000	.....	132	Solid...	36x4	40x3½*	Under seat .	4	4.250x5.000	28.90	T-head...	Pairs.....	Opp.....	Hel'l.....	Pump....	Springs ..
Martin, L	7,000	.....	145	Solid...	36x5	40x4*	Under seat .	4	4.750x5.500	36.10	T-head...	Pairs.....	Opp.....	Hel'l.....	Pump....	Springs ..
Menominee, A-3	1,500	1,125	122	Solid...	32x3½	32x3½	Under hood.	4	3.750x4.500	22.50	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Rigid....
Menominee, B-3	2,000	1,400	.....	Solid...	34x3½	34x3½	Under hood.	4	4.000x5.000	25.60	L-head...	Pairs.....	Left.....	Gear.....	Thermo..	Springs ..
Menominee, C	3,000	1,800	130	Solid...	36x4	36x5	Under hood.	4	4.000x5.000	25.60	L-head...	Pairs.....	Left.....	Gear.....	Thermo..	Springs ..
M & E, 4-ton	8,000	2,750	114	Solid...	34x7*	40x6	Under seat .	4	4.125x5.250	27.25	L-head...	Pairs.....	Right....	Gear.....	Pump....	Springs ..
Mercury, P	1,000	.....	85	Solid...	38x2	40x2	Under floor.	2	4.250x4.000	14.50	L-head...	Sep.....	Side.....	Gear.....	Air.....	.....
Miller, A	1,000	800	112	Pneu ..	32x3½	32x3½	Under hood.	4	3.500x4.000	19.60	L-head...	Block....	Left.....	Gear.....	Pump....	Rigid....
Modern, F	1,500	1,500	136	Solid...	36x3½	36x3½	Under hood.	4	3.500x5.000	19.60	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Modern, G	2,000	1,700	136	Solid...	36x3½	36x4	Under hood.	4	3.750x5.250	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Modern, H	3,000	1,950	136	Solid...	36x3½	36x5	Under hood.	4	4.125x5.250	27.25	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Mogul, L	4,000	2 360	133–44	Solid...	36x5	38x3½*	Under hood.	4	4.125x5.250	27.25	L-head...	Block....	Left.....	Hel'l.....	Pump....	Springs ..
Mogul, G	4,000	2,750	120	Solid...	36x4	36x5	Under seat .	4	4.125x5.250	27.25	L-head...	Block....	Left.....	Hel'l.....	Pump....	Springs ..
Mogul, O	8,000	3,800	142	Solid...	36x6	40x5*	Under seat .	4	5.000x5.750	40.00	T-head...	Pairs.....	Opp.....	Hel'l.....	Pump....	Springs ..
Mogul, M	12,000	4,700	155	Solid...	36x7	40x7*	Under seat .	4	5.250x5.750	44.10	T-head...	Pairs.....	Opp.....	Hel'l.....	Pump....	Springs ..
Mogul, U	12,000	4,750	188	Solid...	36x7	40x7*	Under seat .	4	5.250x5.750	44.10	T-head...	Pairs.....	Opp.....	Hel'l.....	Pump....	Springs ..
Monitor, G	1,000	1,050	110	Solid...	34x3	34x3	Under hood.	4	3.500x4.000	19.60	T-head...	Pairs.....	Opp.....	.....	Pump....	Springs..
Monitor, D	2,000	1,650	100	Solid...	34x3½	34x3½	Under seat .	4	3.750x5.000	22.50	T-head...	Pairs.....	Opp.....	.....	Thermo..	Springs..
Moon, A	1,000	1,350	112	Pneu ..	33x4	33x4	Under hood.	4	3.500x5.000	19.60	L-head...	Block....	Side.....	Gear.....	Pump....	Rigid....
Moon, B	3,000	1,800	125	Solid...	36x3½	36x4	Under hood.	4	3.750x5.250	22.50	L-head...	Block....	Side.....	Gear.....	Pump....	Spring s..
Moore, 1½-ton	3,000	1,950	130	Solid...	36x3½	36x4	Under hood.	4	4.125x5.250	27.25	L-head...	Block....	Side.....	.....	Pump....	Springs ..
Moore, 2-ton	4,000	2,500	160	Solid...	36x4	36x3½*	Under hood.	4	4.125x5.250	27.25	L-head...	Block....	Side.....	.....	Pump....	Springs ..
Moore, 3-ton	6,000	3,150	142	Solid...	36x5	36x4*	Under hood.	4	4.500x5.500	32.40	L-head...	Pairs.....	Side.....	.....	Pump....	Springs ..
Moore, 4-ton	8,000	3,900	Opt	Solid...	36x5	36x5*	Under hood.	4	4.750x5.500	36.10	.....	.....	.....	.....	Pump....	.....
Moore, 5-ton	10,000	4,500	173	Solid...	36x6	42x5*	Under hood.	4	5.250x7.000	44.10	T-head...	Pairs.....	Opp.....	.....	Pump....	Springs ..
Mora, 24	2,000	1,400	115	Solid...	36x2½	36x3	Under hood.	4	3.375x5.000	18.25	L-head...	Block....	Right....	Gear.....	Thermo..	Trunn'ns.
Moreland, 1500-lb	1,500	1,700	.....	.....	.....	.....	Under hood.	4	3.750x5.250	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Moreland, 2-ton	4,000	2,350	120–44	.....	.....	.....	Under seat .	4	4.500x5.500	32.40	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Springs ..
Moreland, 5-ton	10,000	4,500	156–92	.....	.....	.....	Under seat .	4	5.250x7.000	44.10	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Natco, 15	2,000	1,925	104	Solid...	36x3½	36x3½	Under seat .	4	3.500x5.000	19.60	L-head...	Block....	Side.....	Gear.....	Thermo..	Springs ..
Nelson-LeMoon, D-1	2,000	1,800	Opt	Solid...	37x3	37x4	Under hood.	4	3.750x5.250	22.50	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Rigid....
Nelson-LeMoon, D-2	4,000	2,250	Opt	Solid...	37x4	37x4*	Under hood.	4	4.125x5.250	27.25	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Rigid....
Nelson-LeMoon, D-3	6,000	2,750	Opt	Solid...	37x5	37x5*	Under hood.	4	4.500x5.500	32.40	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Rigid....
Nevada, H**	6,000	3,500	144	Solid...	36x6	36x6	Under seat .	4	4.500x6.750	32.40	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Springs ..
New York	.....	2,000	129	.....	.....	.....	Under hood.	4	3.750x5.250	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
O. K., A	1 200	800	112	.....	32x3½	32x3½	Under hood.	4	3.500x4.250	19.60	L-head...	Pairs.....	Left.....	Gear.....	Pump....	Springs ..
O. K., 1-ton	2,000	800	125	.....	34x3½	34x4	Under hood.	4	3.750x5.250	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Overland, 79	800	.....	114	Pneu ..	33x4	33x4	Under hood.	4	4.125x4.500	27.25	L-head...	Sep.....	Left.....	Gear.....	Thermo..	Trunn'ns.
Packard, 2-ton	4,000	2,800	120–44	Solid...	34x3½	34x4	Under hood.	4	4.063x5.125	26.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Packard, 3-ton	6,000	3,400	Opt	Solid...	.....	.....	Under hood.	4	4.500x5.500	32.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Packard, 4-ton	8,000	3,550	Opt	Solid...	.....	.....	Under hood.	4	4.500x5.500	32.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Packard, 5-ton	10,000	4,500	144–68	Solid...	.....	.....	Under hood.	4	5.000x5.500	40.00	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Packard, 6-ton	12,000	4,650	120–68	Solid...	.....	.....	Under hood.	4	5.000x5.500	40.00	T-head ..	Pairs.....	Opp.....	Gear.....	Pump....	Springs
Palmer-Meyer, 1-ton	2,000	1,600	118	Solid...	34x3½	34x4	Under hood.	4	3.750x5.500	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Cushions.
Palmer-Meyer, 2½-ton	3,000	1,975	130–44	Solid...	34x4	34x5	Under hood.	4	4.125x5.250	27.25	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Palmer-Moore, C	1,600	1,350	102	.....	36x2½	36x3	Under hood.	3	4.000x4.000	.....	2-cycle...	Sep.....	.....	.....	Air.....	.....
Pathfinder, 1-ton	2 000	.....	120	.....	.....	.....	.....	4	4.125x5.250	27.25	L-head...	.....	Side.....	Gear.....	.....	.....
Peerless, 3-ton	6,000	3,700	151–74	Solid...	36x4	40x4	Under hood.	4	4.500x6.500	32.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Peerless, 4-ton	8,000	4,000	151–74	Solid...	36x5	40x5	Under hood.	4	4.500x6.500	32.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Peerless, 5-ton	10,000	4,500	151–74	Solid...	38x6	42x6	Under hood.	4	4.500x6.500	32.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Peerless, 6-ton	12,000	.....	151–74	Solid...	38x7	42x7	Under hood.	4	4.500x6.500	32.40	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Perfex, 18	1,000	875	116	Pneu ..	31x3½	31x3½	Under hood.	4	3.375x4.000	18.25	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Rigid....
Pierce-Arrow, X-2	4,000	3,000	150–80	Solid...	36x4	36x4*	Under hood.	4	4.000x5.500	25.60	T-head...	Pairs.....	Opp.....	Gear.. ..	Pump....	Trunn'ns.
Pierce-Arrow, R-5	10,000	4,500	Opt	Solid...	36x5	40x6*	Under hood.	4	4.875x6.000	38.00	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Trunn'ns.
Pope-Hartford, 3-ton	6,000	3,350	138½	Solid...	36x6	36x4*	Seat & hood	4	4.750x5.500	36.10	I-head...	Pairs.....	Head....	Gear.....	Pump....	Springs ..
Pope-Hartford, 5-ton	10,000	4,350	140	Solid...	36x7	42x6*	Seat & hood	4	4.750x5.500	36.10	I-head...	Pairs.....	Head....	Gear.....	Pump....	Springs ..
Progress, A	3,000	.....	.....	Solid...	36x3½	36x5	.....	4	4.125x5.250	27.25	L-head...	Pairs.....	Side.....	Gear.....	Pump....	Springs ..
Progress, B	6,000	3,500	.....	Solid...	36x5	36x6	.....	4	4.500x5.500	32.40	L-head...	Pairs.....	Side.....	Gear.....	Pump....	Springs ..
Reo, J	4,000	1,650	130–46	Solid...	36x4	36x3*	Under hood.	4	4.000x4.500	25.60	I-head...	Pairs.....	S & H ...	Hel'l.....	Pump....	Rigid....
Rockford, 1500-lb	1,500	1,500	126	Solid...	36x4½	36x4½	Under hood.	4	3.750x5.250	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..
Rockford, 2-ton	4,000	2,500	128	Solid...	36x4	36x3½*	Under hood.	4	4.250x5.000	28.90	T-head...	Pairs.....	Opp.....	Gear.....	Pump....	Springs ..
Sanford, K	2,000	1,660	106	Solid...	36x3½	36x3½	Under seat .	4	4.000x4.500	25.60	L-head...	Pairs.....	Side.....	Gear.....	Pump....	Springs ..
Sanford, L	3,000	1,910	118	Solid...	36x3½	36x4	Under seat .	4	4.000x4.500	25.60	L-head...	Pairs.....	Side.....	Gear.....	Pump....	Springs ..
Saurer, 6½-ton	13,000	5,800	.....	.....	.....	.....	Under hood.	4	4.375x5.500	30.63	T-head...	Pairs.....	Opp.....	Chain....	Pump....	Rigid....
S & S, A	1,500	2,000	136	Solid...	36x4½	36x4½	Under hood.	4	4.125x5.250	27.25	L-head...	Block....	Left.....	Gear.....	Pump....	Rigid....
Schacht, 2-ton	4,000	2,650	139	Solid...	38x3½	40x3*	Under hood.	4	4.250x5.500	28.90	L-head...	Block....	Right....	Gear.....	Pump....	Springs ..
Selden, J	.....	2,000	.....	.....	.....	.....	Under hood	4	3.750x5.250	22.50	L-head...	Block....	Left.....	Gear.....	Pump....	Springs ..

** Drives on four wheels

ABBREVIATIONS:—Tires: Pneu, pneumatic; *, dual tread. **Motor Location:** Bet Seats, between seats. **Cylinders:** Sep, separately cast. **Valve Location:** Opp, opposite; S & H, side and head. **Camshaft Drive:** Gear, type not known; Hel'l, helical. **Cooling:** Thermo, thermo-syphon. **Radiator Suspension:** S & T, springs and trunnions. **Ignition:** Sing, single; Doub, double; 2-Pt, two point; Auto, automatic; Gov, governed; Opt, optional. **Motor Lubrication:** Spl-pres, splash and pressure. **Clutch:** Exp bd, expanding band; Con bd, contracting band.

Load Capacity and Complete Specifications

IGNITION			Carbureter	Motor Lubrication	TRANSMISSION						RUNNING GEAR				BEARINGS		NAME AND MODEL
						GEARSET					SPRINGS		CONTROL				
									Gear Ratio				Location				
System	Magneto	Control			Clutch Type	Type	Location	No. Forw'd Speeds	on High	Final Drive	Front	Rear	Steering	Gear-Shift	Gearset	Rear Axle	
2-Pt	Bosch	Hand	Stromberg	Pressure	Disk	Sel	Unit J	3	6.60-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Martin, A
Doub		Hand		Pressure	Disk	Sel	Unit J	3	8.95-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Martin, E
Doub		Hand		Pressure	Disk	Sel	Unit J	3	9.10-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Martin, L
Dual	Remy	Hand	Schebler	Spl-Pres	Disk	Sel	Unit M	3	2.12-1	Bevel	½ Ell	Plat	Right		Roll	Ball	Menominee, A-3
Dual	Bosch	Hand	Stromberg	Spl-Pres	Disk	Sel	Unit M	3		Bevel	½ Ell	Plat	Right	Center	Ball	Roll	Menominee, B-3
Dup'x	Bosch	Hand	Stromberg	Splash	Disk	Sel	Unit M	3	8.00-1	Bevel	½ Ell	Plat	Right	Center	Ball	Roll	Menominee, C
Dual	Bosch	Hand	Stromberg	Splash	Disk	Sel	Unit J	3	3.50-1	Chain	½ Ell	½ Ell	Right	Right		Plain	M.& E 4-ten
Dual	Remy	Fixed	Own	Spl-Pres	Disk	Plan	Unit M	2		Chain	Ell	Ell	Right	Right	Plain	Roll	Mercury, P
Sing	Opt	Fixed		Splash	Cone	Sel	Unit M	3		Bevel	½ Ell	Ell	Left	Center	Plain	Roll	Miller, A
Dual	Opt	Hand	Schebler	Splash	Cone	Sel	Unit J	3	6.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Modern, F
Doub	Bosch	Hand	Schebler	Splash	Cone	Sel	Unit J	3	7.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Modern, G
Dual	Bosch	Hand	Schebler	Splash	Cone	Sel	Unit J	3	9.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Modern, H
Sing	Eisemann	Fixed	Stromberg	Splash	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Mogul, L
Dual	Bosch	Hand	Stromberg	Splash	Disk	Sel	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Mogul, G
Doub	Mea	Hand	Stromberg	Splash	Disk	Prog	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Mogul, O
Doub	Mea	Hand	Stromberg	Splash	Disk	Prog	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Mogul, M
Doub	Mea	Hand	Stromberg	Splash	Disk	Prog	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Mogul, U
Doub	Mich	Hand	Marvel	Splash	Cone	Sel	Unit M	3	8.00-1	Bevel	½ Ell	Ell	Left	Center	B & R	Roll	Monitor, B
Doub	Bosch	Hand	Rayfield	Splash	Disk	Sel	Unit M	3	7.00-1	Bevel	½ Ell	Ell	Left	Center	B & R	Roll	Monitor, D
Dual	Remy	Hand	Stromberg	Splash	Cone	Sel	Unit M	3		Bevel	½ Ell	½ Ell	Left	Center	Ball	Ball	Moon, A
Dual	Remy	Gov	Stromberg		Cone	Sel	Amid	3		Chain	½ Ell	Cross	Left	Center		Ball	Moon, B
Dual	Bosch	Hand	Schebler	Splash	Cone	Sel	Amid	3	6.50-1	Chain	½ Ell	½ Ell	Right	Right	Plain	Roll	Moore, 1½-ton
Dual	Bosch	Hand	Schebler	Splash	Cone	Sel	Amid	3	6.50-1	Chain	½ Ell	½ Ell	Right	Right	Plain	Roll	Moore, 2-ton
Dual	Bosch	Hand	Schebler	Splash	Cone	Sel	Amid	3	8.38-1	Chain	½ Ell	½ Ell	Right	Right	Plain	Roll	Moore, 3-ton
Dual	Bosch			Splash	Cone	Sel		3		Chain	½ Ell	½ Ell				Roll	Moore, 4-ton
Dual	Bosch	Hand	Schebler	Splash	Cone	Sel	Amid	4	9.82-1	Chain	½ Ell	½ Ell	Right	Right	Plain	Roll	Moore, 5-ton
Sing		Fixed	Stromberg	Splash	Disk	Plan	Amid	2	6.50-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Mora, 24
	West'se	Auto	Schebler	Splash	Disk	Sel	Unit M	3	5.10-1	T Worm	½ Ell	½ Ell	Right	Center	Roll	Roll	Moreland, 1500-lb
	West'se	Auto	Schebler	Splash	Disk	Sel	Unit M	3	7.75-1	T Worm	½ Ell	½ Ell	Right	Center	Roll	Roll	Moreland, 2-ton
	West'se	Auto	Schebler	Spl-Pres		Sel	Amid	4	10.50-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Moreland, 5-ton
Sing	U & H	Fixed	Zenith	Pressure	Cone	Sel	Unit J	3	7.57-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Natco, 15
Sing	Bosch	Fixed	Rayfield	Splash	Disk	Sel	Unit M	3	7.50-1	Chain	½ Ell	½ Ell	Right	Center	Roll	Roll	Nelson-LeMoon, D-1
Dual	Bosch	Hand	Rayfield	Splash	Disk	Sel	Unit M	3	8.50-1	Chain	½ Ell	½ Ell	Right	Center	Roll	Roll	Nelson-LeMoon, D-2
Dual	Bosch	Hand	Rayfield	Splash	Disk	Sel	Unit M	3	9.50-1	Chain	½ Ell	½ Ell	Right	Center	Roll	Roll	Nelson-LeMoon, D-3
Dual	Bosch	Gov	Holley	Spl-Pres	Cone	Sel	Amid	3			½ Ell	Plat	Right	Right	Ball	Roll	**Nevada, H
Sing	Bosch	Fixed	Stromberg	Spl-Pres	Cone	Sel	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	New York
Sing	Bosch		Opt	Splash	Cone	Sel	Unit M	3	4.00-1	Bevel	½ Ell		Left	Center	Plain	Roll	O. K., A
Sing	Bosch		Opt	Splash	Cone	Sel	Unit M	3	8.50-1	Bevel	½ Ell		Left	Center	Plain	Roll	O. K., 1-ton
Dual	Spld'rf	Hand	Schebler	Splash	Cone	Sel	Unit X	3		Bevel	½ Ell	½ Ell	Right	Center	Ball	Roll	Overland, 79
Dual	Eisemann	Auto	Own	Splash	Disk	Prog	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Packard, 2-ton
Dual	Eisemann	Auto	Own	Splash	Disk	Prog	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Packard, 3-ton
Dual	Eisemann	Auto	Own	Splash	Disk	Prog	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Packard, 4-ton
Dual	Eisemann	Auto	Own	Splash	Disk	Prog	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Rol	Packard, 5-ton
Dual	Eisemann	Auto	Own	Splash	Disk	Prog	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Packard, 6-ton
Dual	Bosch	Gov	Schebler	Spl-Pres	Disk	Sel	Unit M	3	7.00-1	Chain	½ Ell	½ Ell	Right	Center	Ball	Roll	Palmer-Meyer, 1-ton
Dual	Bosch	Gov	Stromberg	Spl-Pres	Disk	Sel	Unit M	3	6.25-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Palmer-Meyer, 2½-ton
Sing	Bosch	Fixed	Own	In fuel		Plan	Amid	2		Chain	½ Ell	½ Ell	Right	Center	Roll	Roll	Palmer-Moore, C
Dual	Eisemann		Schebler	Spl-Pres	Cone	Sel		3		Bevel	½ Ell						Pathfinder, 1-ton
Dual	Bosch	Hand	Own	Splash	Cone	Sel	Amid	4	7.47-1	Chain	½ Ell	½ Ell	Right	Right	B & R	Roll	Peerless, 3-ton
Dual	Bosch	Hand	Own	Splash	Cone	Sel	Amid	4	8.70-1	Chain	½ Ell	½ Ell	Right	Right	B & R	Roll	Peerless, 4-ton
Dual	Bosch	Hand	Own	Splash	Cone	Sel	Amid	4	10.50-1	Chain	½ Ell	½ Ell	Right	Right	B & R	Roll	Peerless, 5-ton
Dual	Bosch	Hand	Own	Splash	Cone	Sel	Amid	4	10.50-1	Chain	½ Ell	½ Ell	Right	Right	B & R	Roll	Peerless, 6-ton
Sing	Spld'rf	Fixed	Stromberg	Splash	Cone	Sel	Amid	3	4.00-1	Bevel	Ell	Ell	Left	Center	B & R	Ball	Perfex, 18
Sing	Bosch	Fixed	Own	Pressure	Cone	Sel	Amid	3		T Worm	½ Ell	½ Ell	Right	Right	Ball	B & R	Pierce-Arrow, X-2
Doub	Bosch	Hand	Own	Pressure	Cone	Sel	Amid	3		T Worm	½ Ell	½ Ell	Right	Right	Ball	B & R	Pierce-Arrow, R-5
Dual		Hand	Own	Spl-Pres	Cone	Sel	Amid	4	11.00-1	Chain	½ Ell	½ Ell	Left	Center	Plain	Roll	Pope-Hartford, 3-ton
Dual		Hand	Own	Spl-Pres	Cone	Sel	Amid	4	16.20-1	Chain	½ Ell	½ Ell	Left	Center	Plain	Roll	Pope-Hartford, 5-ton
Dual	Opt	Hand	Stromberg	Spl-Pres	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Progress, A
Dual	Opt	Hand	Stromberg	Spl-Pres	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Progress, B
Dual	Nat'l	Hand	Holley	Spl-Pres	Disk	Sel	Amid	3	8.78-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Reo, J
Sing	Pitt'ld	Fixed	Stromberg	Splash	Disk	Sel	Unit M	3	5.00-1	Bevel	½ Ell	½ Ell		Center	Ball	Roll	Rockford, 1500-lb
Sing	Pitt'ld	Fixed	Stromberg	Pressure	Cone	Sel	Unit J	3	7.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Rockford, 2-ton
Dual	Remy	Gov	Schebler	Splash	Disk	Sel	Unit M	3	9.00-1	Chain	½ Ell	Plat	Right	Right	Ball	Roll	Sanford, K
Dual	Remy	Gov	Schebler	Splash	Disk	Sel	Unit M	3	9.00-1	Chain	½ Ell	Plat	Right	Right	Ball	Roll	Sanford, L
Sing	Eisemann	Hand	Own	Pressure	Cone	Sel	Amid	4	13.50-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Ball	Saurer, 6½-ton
Dual	Bosch	Hand	Rayfield	Splash	Disk	Sel	Unit M	3	4.50-1	Bevel	½ Ell	½ Ell	Right	Center	Ball	Ball	S & S, A
Doub		Hand	Schebler	Splash	Cone	Sel	Amid	3		T Worm	½ Ell	¾ Plat	Left	Center		Roll	Schacht, 2-ton
Dual	Briggs	Hand	Stromberg	Pressure	Disk	Sel	Unit M	3	7.82-1	Chain	½ Ell	½ Ell	Left	Center	Ball		Selden, J

ABBREVIATIONS:—**Gearset:** Sel, selective; Prog, progressive; Plan, planetary; Fric, friction; Ind C, individual clutch. **Gearset Location:** Amid, amidships; Unit M, unit with the motor; Unit J, unit with the jackshaft; Unit X, unit with the rear axle. **Final Drive:** Int G, internal gear; Bevel, shaft with bevel; T Worm, shaft with top worm; Chain, by chain to the rear wheels. **Springs:** ½Ell, semi-elliptic; Ell, elliptic; ¾Ell, ¾ elliptic; Plat, platform. **Bearings:** Roll, roller; B & R, ball and roller; Opt, optional.

Gasoline Truck Chassis on the 1914 Market

NAME AND MODEL	Load Capacity, Pounds	Chassis Price	Wheelbase, Inches	TIRES			Motor Location	No. Cylinders	Bore and Stroke, Inches	S. A. E. H. P	CYLINDERS		Valve Location	Camshaft Drive	COOLING	
				Kind	Front	Rear					Shape	How Cast			Circulation	Radiator Suspension
Service, J	1,500	1,350	115	Solid	36x3	36x3	Under hood	4	3.750x5.500	22.50	L-head	Block	Right	Gear	Pump	Springs
Service, K	2,000	1,475	115	Solid	34x3	34x3½	Under hood	4	3.750x5.500	22.50	L-head	Block	Right	Gear	Pump	Springs
Service, M	3,000	1,675	130	Solid	34x3½	34x4	Under hood	4	4.125x5.500	27.25	L-head	Block	Right	Gear	Pump	Springs
Service, Q	3,000	1,800	145	Solid	36x3½	36x5	Under hood	4	4.125x5.500	27.25	L-head	Block	Right	Gear	Pump	Springs
Service, P	4,000	2,375	150	Solid	36x4	40x3½*	Under hood	4	4.125x5.500	27.25	L-head	Block	Right	Gear	Pump	Springs
Service, H	6,000	2,975	171	Solid	36x5	40x5*	Under hood	4	4.250x5.500	28.90	L-head	Block	Right	Gear	Pump	Springs
Siebert, H	1,500	1,250	118	Solid	36x3	36x3½	Under hood	4	3.750x4.500	22.50	L-head	Block	Right	Hel'l	Thermo	Springs
Signal, ¾-ton	1,500	1,350	115	Solid	34x3	36x3½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Rigid
Speedwell, Y	4,000	2,850	115	Solid	36x4	36x3½*	Under seat	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Speedwell, Z	8,000	3,750	115	Solid	36x5	36x5*	Under seat	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Springs
Speedwell, X	12,000	4,400	139	Solid	36x6	36x6*	Under seat	4	5.000x5.000	40.00	L-head	Pairs	Left	Gear	Pump	Springs
Standard, 3-ton	6,000	2,750	Opt	Solid	36x5	36x5*	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Right	Gear	Pump	Cushions
Star, B	2,000	1,500	120	Solid	34x3	34x3½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Star, A	3,000	1,800	130	Solid	34x3½	36x5	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Stearns, 5-ton	10,000	3,800	144	Solid	34x5	38x5*	Under hood	4	4.750x6.000	36.10	L-head	Sep	Right	Chain	Pump	Springs
Stearns, 5-ton	10,000	3,900	180	Solid	34x5	38x5*	Under hood	4	4.750x6.000	36.10	L-head	Sep	Right	Chain	Pump	Springs
Stegeman, ¾-ton	1,500	1,600	125	Pneu	34x4½	34x4½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Hel'l	Pump	Cradle
Stegeman, 1-ton	2,000	2,250	130–50	Solid	34x3	36x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Hel'l	Pump	Cradle
Stegeman, 2-ton	4,000	2,950	142–62	Solid	34x3½	36x3½*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Hel'l	Pump	Cradle
Stegeman, 3-ton	6,000	3,500	155	Solid	36x4	40x4*	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Hel'l	Pump	Cradle
Stegeman, 4-ton	8,000	3,950	155–75	Solid	36x5	40x5*	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Hel'l	Pump	Cradle
Sternberg, 2-ton	4,000	2,800	116–60	Solid	34x4	36x3½*	Under seat	4	4.250x6.750	28.90	L-head	Pairs	Left	Gear	Pump	Springs
Sternberg, 2½-ton	5,000	3,250	148	Solid	36x4	38x4*	Under hood	4	4.250x5.750	28.90	L-head	Pairs	Left	Gear	Pump	Rigid
Sternberg, 3-ton	6,000	3,400	130–60	Solid	36x5	40x4*	Under seat	4	4.250x6.750	28.90	L-head	Pairs	Left	Gear	Pump	Springs
Sternberg, 4-ton	8,000		144	Solid	36x5	40x5*	Under seat	4	4.500x6.750	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Sternberg, 5-ton	10,000	4,500	144	Solid	38x6	42x6*	Under seat	4	4.500x6.750	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Sternberg, 6-ton	12,000	4,750	144	Solid	38x6	42x6*	Under seat	4	4.750x6.750	36.10	L-head	Pairs	Left	Gear	Pump	Spring
Sternberg, 7-ton	14,000	5,000	144	Solid	38x7	42x7*	Under seat	4	4.750x6.750	36.10	L-head	Pairs	Left	Gear	Pump	Springs
Stewart, ¾-ton	1,500	1,500	125	Pneu	34x4½	34x4½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Studebaker, ¾-ton	1,500	1,050	106½		34x4½	34x4½	Under hood	4	3.500x5.000	19.60	L-head	Block	Left	Hel'l	Pump	Rigid
Sullivan, 51	2,000	1,050	120	Solid	36x2½	36x3	Under hood	2	4.500x4.500	16.20	I-head	Sep	Head	Gear	Thermo	Rigid
Tiffin, A	1,200	1,600	112	Opt	34x3	34x3	Under hood	4	3.750x4.500	22.50	L-head	Block	Right	Gear	Thermo	Springs
Tiffin, G	2,000	2,000	128	Solid	36x3½	36x4	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Springs
Tiffin, M	4,000	2,600	140	Solid	36x4	38x3½*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Traboid, ¾-ton	1,500	975	105	Solid	36x2½	38x3	Under hood	4	3.500x5.000	19.60	L-head	Block	Side	Gear	Thermo	Trunn'ns
Traboid, C	2,000	1,475	128	Solid	36x3	38x4	Under hood	4	4.125x5.250	27.25	L-head	Block	Right	Gear	Pump	Trunn'ns
Traboid, 1½-ton	3,000		130	Solid	36x3½	38x4	Under hood	4	4.125x5.250	27.25	L-head	Block	Right	Gear	Pump	Trunn'ns
Traboid, 2-ton	4,000	2,450	130	Solid	36x4	38x4*	Under seat	4	4.250x5.500	28.90	L-head	Block	Right		Pump	Springs
Transit, F	4,000	2,850	144	Solid	36x4	36x4*	Under seat	4	4.125x5.250	27.25	L-head	Block	Left	Gear	Pump	Springs
Transit, T	7,000	3,500	144	Solid	36x5*	36x5*	Under seat	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Transit, V	10,000	4,500	144	Solid	36x6	40x6*	Under seat	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Twin City, 2-ton	4,000	1,350	104	Solid	34x3	36x3½	Under seat	2	5.000x5.000	20.00	L-head	Sep	Head	Gear	Thermo	Springs
Universal, C	3,000	1,950	130	Solid	34x3½	34x5	Under hood	4	3.750x5.250	22.50	L-head	Block	Right		Pump	Springs
Universal, A	6,000	3,400	132–50	Solid	36x5	36x4*	Under seat	4	4.000x5.500	25.60	T-head	Pairs	Opp		Pump	Springs
U. S., E	4,000	2,800	132	Solid	35x3½	37x3½*	Under hood	4	4.125x5.250	27.25	L-head	Block	Left	Hel'l	Pump	Springs
U. S., D	6,000	3,500	144	Solid	35x5	37x5*	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Hel'l	Pump	Springs
Veerac, B	2,000	1,100	86	Solid			Under floor	2	4.000x4.000		2-cycle	Sep			Air	
Velie, Y	4,000	2,850	148–72	Solid	36x4	36x4*	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Velie, Z	6,000	3,350	148–72	Solid			Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Vulcan, 2-ton	4,000	2,750	144	Solid	36x4	34x3½*	Under hood	4	4.375x5.500	30.63	L-head	Pairs	Left	Gear	Thermo	Trunn'ns
Vulcan, 3-ton	6,000	3,250	150	Solid	36x5	34x4*	Under hood	4	4.375x5.500	30.63	L-head	Pairs	Left	Gear	Thermo	Trunn'ns
Vulcan, 4-ton	8,000	4,000	162	Solid	36x6	36x5*	Under hood	4	4.375x5.500	30.63	L-head	Pairs	Left	Gear	Thermo	Trunn'ns
Vulcan, 4½-ton	9,000	4,250	162	Solid	36x6	36x5*	Under hood	4	4.375x5.500	30.63	L-head	Pairs	Left	Gear	Thermo	Trunn'ns
Vulcan, 5-ton	10,000	4,500	162	Solid	36x6	36x6*	Under hood	4	4.375x5.500	30.63	L-head	Pairs	Left	Gear	Thermo	Trunn'ns
Vulcan, 7-ton	14,000	6,000	156	Solid	36x7	42x7*	Under hood	4	4.750x5.500	36.10	L-head	Pairs	Left	Gear	Thermo	Trunn'ns
Wade, Delivery	800	400	72	Solid	36x2	36x2	Under body	1	4.500x6.000	8.10	L-head		Left	Gear	Air	
Wagenhals	800		80		30x3	34x4½		4	3.500x3.375	19.60	L-head	Pairs	Right	Gear	Pump	Rigid
Ware, A		3,000	Opt				Under hood	4	4.250x6.750	28.90	L-head	Pairs	Left	Gear	Pump	Trunn'ns
White, GBBE	1,500	2,100	133½	Pneu	34x4½	34x4½	Under hood	4	3.750x5.125	22.50	L-head	Block	Right	Hel'l	Pump	Springs
White, TBC	3,000	3,000	145½	Pneu	36x4½	36x4*	Under hood	4	3.750x5.125	22.50	L-head	Block	Right	Hel'l	Pump	Springs
White, GTA	6,000	3,700	163	Solid	36x5	40x4*	Under hood	4	3.750x5.125	22.50	L-head	Block	Right	Hel'l	Pump	Springs
White, TC	10,000	4,500	165	Solid	36x5	40x6*	Under hood	4	4.250x5.750	28.90	L-head	Block	Right	Hel'l	Pump	Springs
Wichita, A	2,000	1,650	110	Solid	34x3	34x4	Under hood	4	3.250x5.000	16.90	L-head	Block	Left	Gear	Thermo	Springs
Wichita, B	4,000	2,100	118	Solid	34x3½	34x3*	Under hood	4	3.500x5.000	19.60	L-head	Block	Left	Gear	Thermo	Springs
Wichita, H	7,000	3,250	162	Solid	36x5	36x5*	Under hood	4	4.250x6.750	28.90	L-head	Pairs	Left	Gear	Pump	Springs
Wilcox, L	2,000		124					4	4.125x5.250	27.25						
Wilcox, N	4,000		118					4	4.250x4.500	28.90						
Wilcox, JA	6,000		128					4	4.250x5.000	28.90						
Willys, Utility 65	1,500	1,350	120		34x4½	36x3½	Under hood	4	4.125x4.500	27.25	L-head	Sep	Left	Gear	Thermo	Springs
Willet, M	1,500	1,650	125	Pneu	34x4½	34x4½	Under hood	4	3.750x5.250	22.50	L-head	Block	Left	Gear	Pump	Rigid
Willet, L	6,000	2,800	144–68	Solid	36x4	36x4*r	Under hood	4	4.500x5.500	32.40	L-head	Pairs	Left	Gear	Pump	Springs
Zimmerman							Under hood	2	4.750x4.000	18.00	L-head	Sep	S & H	Gear	Air	

**Drives on four wheels.

ABBREVIATIONS:—Tires: Pneu, pneumatic; *, dual tread. **Motor Location:** Bet Seats, between seats. **Cylinders:** Sep, separately cast. **Valve Location:** Opp, opposite; S & H, side and he... **Camshaft Drive:** Gear, type not known; Hel'l, helical. **Cooling:** Thermo, thermo-syphon. **Radiator Suspension:** S & T, springs and trunnions. **Ingition:** Sing, single; Doub, double; 2-Pt, t... point; Auto, automatic; Gov, governed; Opt, optional. **Motor Lubrication:** Spl-pres, splash and pressure. **Clutch:** Exp bd, expanding band; Con bd, contracting band.

Load Capacity and Complete Specifications

IGNITION			Carburetor	Motor Lubrication	TRANSMISSION						RUNNING GEAR				BEARINGS		NAME AND MODEL
					GEARSET						SPRINGS		CONTROL				
													Location				
System	Magneto	Control			Clutch Type	Type	Location	No. Forw'd Speeds	Gear Ratio on High	Final Drive	Front	Rear	Steering	Gear-Shift	Gearset	Rear Axle	
Dual	Briggs	Hand	Stromberg	Splash		Fric				Chain	½ Ell	½ Ell	Left	Left		Ball	Service, J
Dual	Briggs	Hand	Stromberg	Splash		Fric				Chain	½ Ell	½ Ell	Left	Left		Ball	Service, K
Dual	Briggs	Hand	Stromberg	Splash		Fric				Chain	½ Ell	½ Ell	Left	Left		Roll	Service, M
Sing	Eisemann	Fixed	Stromberg	Splash	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Center		Roll	Service, Q
Sing	Eisemann	Hand	Stromberg	Splash	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Center		Roll	Service, P
Sing	Eisemann	Fixed	Stromberg	Splash	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Center		Roll	Service, H
Sing	Mea	Hand	Carter	Splash	Cone	Sel	Unit J	3		Chain	¾ Ell	Ell	Left	Center	Ball	Ball	Siebert, H
Sing	Eisemann	Fixed	Stromberg	Splash	Cone	Sel	Unit J	3	7.50-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Signal, ¾-ton
Sing	Eisemann	Auto	Schebler	Splash	Cone	Sel	Amid	3	9.36-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Speedwell, Y
Sing	Eisemann	Auto	Schebler	Splash	Cone	Sel	Amid	3	10.28-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Speedwell, Z
Sing	Eisemann	Auto	Schebler	Splash	Cone	Sel	Amid	3	10.28-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Speedwell, X
Sing	Eisemann	Auto	Stromberg	Spl-Pres	Disk	Sel	Unit M	3	8.95-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Standard, 3-ton
Opt	Opt	Hand	Opt	Splash	Disk	Sel	Unit M	3	8.50-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Star, B
Opt	Opt	Hand	Opt	Splash	Cone	Sel	Unit J	3	8.50-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Star, A
Dual	Bosch	Hand	Stromberg	Spl-Pres	Disk	Sel	Amid	4	9.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Stearns, 5-ton
Dual	Bosch	Hand	Stromberg	Spl-Pres	Disk	Sel	Amid	4	9.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Stearns, 5-ton
Sing	Eisemann	Gov	Carter	Spl-Pres	Disk	Sel	Unit M	3		Bevel	½ Ell	½ Ell	Left	Center	Ball	Ball	Stegeman, ½-ton
Sing	Eisemann	Gov	Carter	Spl-Pres	Disk	Sel	Unit M	3		Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Stegeman, 1-ton
Sing	Eisemann	Gov	Carter	Spl-Pres	Disk	Sel	Unit M	3		Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Stegeman, 2-ton
Sing	Eisemann	Gov	Carter	Spl-Pres	Disk	Sel	Unit M	3		Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Stegeman, 3-ton
Sing	Eisemann	Gov	Carter	Spl-Pres	Disk	Sel	Unit M	3		Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Stegeman, 4-tob
Dual	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	5.77-1	Chain	½ Ell	Plat	Right	Right	Ball	Roll	Sternberg, 2-ton
Sing	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	7.75-1	T Worm	½ Ell	½ Ell	Left	Center	Ball	Roll	Sternberg, 2½-ton
Dual	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	7.90-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Sternberg, 3-ton
Dual	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	10.40-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Sternberg, 4-ton
Dual	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	11.22-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Sternberg, 5-ton
Dual	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	9.84-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Sternberg, 6-ton
Dual	Eisemann	Auto	Holley	Splash	Disk	Sel	Amid	3	11.22-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Sternberg, 7-ton
Sing	Bosch	Fixed	Mayer	Spl-Pres	Disk	Sel	Amid	3		Bevel	½ Ell	½ Ell	Left	Center	Roll	Roll	Stewart, ¾-ton
Dual	Remy	Hand	Schebler	Spl-Pres	Cone	Sel	Unit X	3	4.60-1	Bevel	½ Ell	Ell	Left	Center	Roll	Roll	Studebaker, ¾-ton
Sing	Bosch	Fixed	Schebler	Spl-Pres	Disk	Plan	Unit J	2		Chain	Ell	Ell	Left	Center	Ball	Ball	Sullivan, 51
Sing	Bosch	Hand	Breeze	Splash	Cone	Sel	Unit J	3	6.67-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Ball	Tiffin, A
Sing	Bosch	Hand	Schebler	Splash	Cone	Sel	Unit J	3	8.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Tiffin, G
Sing	Bosch	Hand	Schebler	Splash	Cone	Sel	Unit J	3	10.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Tiffin, M
Dual	Briggs	Hand	Stromberg	Spl-Pres	Disk	Plan	Unit J	2	7.50-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	Trabold, ½-ton
Dual	Briggs	Hand	Stromberg	Spl-Pres	Disk	Sel	Unit M	3	8.00-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Trabold, C
Dual	Briggs	Hand	Stromberg	Spl-Pres	Cone	Sel	Unit J	3	8.00-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	Trabold, 1½-ton
Dual	Briggs	Hand	Stromberg	Spl-Pres	Disk	Sel	Unit M	3	8.50-1	T Worm	½ Ell	½ Ell	Left	Center	Roll	Roll	Trabold, 2-ton
Sing	Mea	Hand	Rayfield	Splash	Disk	Sel	Unit J	3	9.00-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Transit, F
Sing	Mea	Hand	Rayfield	Splash	Disk	Sel	Unit J	3	10.74-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Transit, T
Sing	Mea	Hand	Rayfield	Splash	Disk	Sel	Unit J	3	13.00-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Transit, V
Sing	K W	Hand	Schebler	Spl-Pres	Disk	Plan	Unit J	2	10.00-1	Chain	½ Ell	½ Ell	Right	Right	Roll	Ball	Twin City, 2-ton
Dual	Eisemann	Hand	Zephyr	Splash	Disk	Sel	Unit M	3		T Worm	½ Ell	½ Ell	Left	Center	B & P	Roll	Universal, C
Dual	Eisemann	Hand	Zephyr	Splash	Disk	Sel	Unit J	3		Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Universal, A
Dual	Bosch	Hand	Stromberg	Spl-Pres	Cone	Ind C	Amid	3	8.00-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	U. S., E
Dual	Bosch	Hand	Stromberg	Spl-Pres	Cone	Ind C	Amid	3	7.80-1	Chain	½ Ell	½ Ell	Left	Center	Ball	Roll	U. S., D
Doub	Opt	Hand	Krice	In fuel	Disk	Plan	Amid	2	6.20-1	Chain	¾ Ell	Ell	Left	Left	Ball	Ball	Veerac, B
Dual	Bosch	Fixed	Stromberg	Splash	Disk	Sel	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Velie, Y
Dual	Bosch	Fixed	Stromberg	Splash	Disk	Sel	Amid	3		Chain	½ Ell	½ Ell	Right	Right	Roll	Roll	Velie, Z
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	7.90-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Vulcan, 2-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	7.90-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Vulcan, 3-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	7.90-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Vulcan, 4-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	7.90-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Vulcan, 4½-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	3	7.90-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Vulcan, 5-ton
Dual	Bosch	Hand	Stromberg	Splash	Cone	Sel	Amid	4	11.40-1	Chain	½ Ell	½ Ell	Right	Right	Ball	Roll	Vulcan, 7-ton
Sing	Wyco	Hand	Schebler	Splash	Disk	Sel	Unit J	2	5.00-1	Chain	Ell	Ell	Right	Right	Plain	Plain	Wade, Delivery
Dual	Spld'rf	Hand	Marvel	Splash	Cone	Plan	Unit M	2	6.00-1	Chain	½ Ell	½ Ell	Center	Pedal		Roll	Wagenhals
Sing	K W	Hand	Holley	Spl-Pres	Disk	Sel	Amid	3		Bevel	Ell		Right	Right	Roll	Roll	Ware, A
Sing	Bosch	Hand	Own	Spl-Pres	Cone	Sel	Amid	4		Bevel	½ Ell	½ Ell	Left	Center	Ball	Ball	White, GBBE
Sing	Bosch	Hand	Own	Spl-Pres	Cone	Sel	Amid	4		Bevel	½ Ell	½ Ell	Left	Center	Ball	Ball	White, TBC
Sing	Bosch	Hand	Own	Spl-Pres	Cone	Sel	Amid	4		Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	White, GTA
Sing	Bosch	Hand	Own	Spl-Pres	Cone	Sel	Amid	4		Chain	½ Ell	½ Ell	Left	Center	Ball	Ball	White, TC
Opt	Opt	Hand	Opt	Spl-Pres	Cone	Sel	Unit J	3	7.32-1	Chain	½ Ell	½ Ell	Right	Center	Roll	Ball	Wichita, A
Opt	Opt	Hand	Opt	Spl-Pres	Cone	Sel	Unit J	3	8.25-1	Chain	½ Ell	½ Ell	Right	Center	Roll	Ball	Wichita, B
Dual	Bosch	Hand	Opt	Spl-Pres	Cone	Sel	Unit J	3	9.39-1	Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Wichita, H
	Mea			Splash	Cone	Sel		3			½ Ell	½ Ell	Right	Center	Roll	Roll	Wilcox, L
Dual	Bosch			Splash	Cone	Sel		3			Ell	Plat			Roll	Roll	Wilcox, N
Dual	Bosch			Splash	Cone	Sel		3			Ell	Plat			Roll		Wilcox, JA
Dual	Spld'rf	Hand	Schebler	Splash	Cone	Sel	Amid	3	6.62-1	Chain	½ Ell	½ Ell	Right	Center	Ball	Roll	Willys Utility, 65
Sing	Eisemann	Auto	Zenith	Spl-Pres	Cone	Sel	Amid	3		Bevel	½ Ell	½ Ell	Left	Center	Roll	Roll	Willet, M
Sing	Eisemann	Auto	Zenith	Spl-Pres	Cone	Sel	Amid	3		Chain	½ Ell	½ Ell	Left	Center	Roll	Roll	Willet, L
Sing	At Kent	Hand	Schebler	Spl-Pres		Plan	Amid	2	2.00-1	Chain	¾ Ell	Ell	Right	Right	Plain	Ball	Zimmerman

ABBREVIATIONS:—**Gearset:** Sel, selective; Prog, progressive; Plan, planetary; Fric, friction; Ind C, individual clutch. **Gearset Location:** Amid, amidships; Unit M, unit with the motor; Unit J, unit with the jackshaft; Unit X, unit with the rear axle. **Final Drive:** Int G, internal gear; Bevel, shaft with bevel; T Worm, shaft with top worm; Chain, by chain to the rear wheels. **Springs:** ½Ell, semi-elliptic; Ell, elliptic; ¾Ell, ¾ elliptic; Plat, platform. **Bearings:** Roll, roller; B & R, ball and roller; Opt, optional.

The Self-Starter and the Motor Truck

Majority of Makers Consider Starting Devices Unnecessary Complication When Applied to Commercial Vehicles—Mechanical Problems Encountered in Mounting and Question of Economy

ALTHOUGH a few makers of commercial vehicles favor the use of self-starting apparatus for their product, it seems to be the general consensus of opinion of the majority of manufacturers that such equipment is a complication that is not warranted at the present time when still in its development stages.

There are many mechanical problems in connection with the making of a truck starting apparatus which assume large proportions. The electric cranking devices which have worked out satisfactorily for passenger cars are not applicable to trucks. Solid tires, stiff springs and cobblestone and other rough pavements subject the whole truck chassis to many times the vibration that the average passenger vehicle chassis receives.

Specially Designed Affairs

Therefore, those electric starter applications for trucks which have worked out satisfactorily have been specially designed affairs to meet the much more exacting conditions. They are stronger built and sturdier devices, and the battery should have some special form of mounting.

But there are arguments in favor of the truck starter. All engineers admit that there is waste of gasoline when the motor is kept running while the truck is standing. The greater the number of stops, the greater the fuel waste.

Below are some views pro and con:

Atterbury

We have tried various starters, but up to this writing we have not succeeded in getting one which in our judgment is just right for truck service.

They seem to be working out nicely in pleasure cars in many instances, but we have not felt that they have reached the stage of perfection and durability and would justify our adopting a truck starter just yet.—C. C. NEAL, Atterbury Motor Car Co.

Avery

We do not believe a motor starter is required on a truck.

Reason No. 1—Do not believe the buyer wants to pay additional cost.

Reason No. 2—Do not want complication. The less extra parts the better for the operator's attention.

Reason No. 3—Truck is bought for business, not pleasure. No trouble starting any motor if carbureter and ignition mechanism are good. Believe operator will pay more attention to these than if he had a motor starter. He will see that they are adjusted right. Not the case always when motor starter is used.

Reason No. 4—The buyer of motor trucks has not to date demanded a motor starter. If you mention starter to a prospective buyer, he says, "Don't want it." He says, "If you sell me a truck with a good carbureter and ignition outfit, that is all that is wanted. My operator will start the truck all right, and, having no starter, will have less mechanism to get out of order."

Our experience with equipment of all kinds has been in the past and will be in the future that it has to be free from complication. Simplicity is the word. To date no starter has been designed that is not more or less complicated. This we think the strongest reason for not applying a motor starter on trucks.—W. J. BRANDON, Mechanical Engineer, Avery Co.

Lambert

We are equipping some of our trucks with electric starters, but are not firmly convinced that this is the solution of the problem as yet. It involves a certain amount of complication that the average truck driver does not comprehend. On the other hand, we have not found anything that satisfies us in the way of a mechanical starter that would take the place of the electric starter, and of course, we appreciate the fact that in the use of some form of starter or another the life of the truck is considerably prolonged. Rather we would say the life of the truck motor.—A. R. LAMBERT, Gen. Sales Mgr., Buckeye Mfg. Co.

Chase

We have very small demand for self starters on trucks. In such cases as we have furnished starters, we have used the Entz starter, made by the Dyneto Electric Co., of Syracuse, N. Y. We have not, however, had enough experience in this line of work to have much opinion, as to the success or failure of the self starter proposition on trucks. As mentioned previously, the demand as represented in our actual orders seems to be small for this class of equipment as yet.—H. J. SMITH, Chase Motor Truck Co.

Federal

We do not favor motor starters for the following reasons:

We do not believe that starters as now built will save the owner any money. In fact, the evidence seems to be all the other way—that they will not even earn interest on the additional investment necessary, even if maintained at their original efficiency.

We do not believe that they will be maintained at their original efficiency or anywhere near it, which will still further increase the loss due to their use. There are many objections from a mechanical standpoint, but they must first certainly show the owner a profit due to their use and until such can be shown to be the case, we do not believe them worthy of very serious consideration.—L. C. FREEMAN, Engineer, Federal Motor Truck Co.

Gramm

We have been fitting starters to our trucks for the past year and a half. The writer is firmly convinced that motor starters are far more necessary on commercial vehicles than on pleasure cars. On the latter, it is merely a matter of convenience, and lessens the labor of operation; with the commercial vehicle, it is not only that, but it means economy and considerable more economy than would at first be thought of. Commercial vehicles, as a rule, are left standing with the motor running, while if a motor starter is equipped on them, the driver would have no hesitancy in shutting the motor down. This would, of course, mean longer life for the motor.

We exhibited the first truck at the last January show equipped with starter. This, of course, created considerable comment, and we have no doubt that but quite a few motor truck manu-

facturers, whose design does not readily permit of a starter, are very much opposed to it. In the first place, it is on account of expense, for their trucks are not designed to economically permit of the attachments of the starter. Then the writer has found from years of experience that the starter application, as applied on pleasure cars, cannot be successfully applied to motor trucks. Our first application was along the accepted lines of practically the same as pleasure cars had been using the year previous, but the fact that the trucks are used so much rougher and road and street conditions over which they travel are a great deal worse than the majority of pleasure cars, and worse than all this, the motor truck is subject to so much vibration due to solid tires, stiff springs, and high rates of speed in the motor. The storage battery also receives such severe usage on account of lack of care. While the pleasure car owner generally sees to it that his car is kept in good condition, the truck owner depends on the truck driver and very seldom looks after the truck until he hears that it is broken down.

As soon as we began discovering these troubles by actual experience we began working out a remedy, and early in the spring had designed and worked out a combination that utilized the starter and generator in a casting that fitted to the top of the transmission in place of the lid. After the most severe testing for a period of four months in which the starter was given the heaviest kind of usage, and on top of this was probably started as many times as the truck would ordinarily get in two years use, we found we had a perfect proposition. The general design makes a very economical manufacturing proposition. We then started one of our trucks out on a 10,000 mile test, in which it was driven over a route covering the worst roads and the hardest conditions we could find, and we have photographs of many trying positions in which this truck was placed which give ample evidence of the severe test, however up to date the starter or transmission either one have not had a tool touched to them. Not a single adjustment of any kind has been made, proving that our design is correct. Our battery never gives us the least bit of trouble any more, from the fact that we had it in the first place made stronger for commercial purposes, and then designed a case that is carried in the center of the chassis on the inside of the frame mounted on eight helical springs top and bottom.

Another point that proves to us that the starter is absolutely a necessity on a commercial vehicle is that one hundred per cent. of our orders ask for the starter, although we are in a position to sell the truck either way, for with our design of transmission if a man does not wish to have the starter, we simply give him credit for the difference in price and place the plain lid on the transmission in its stead.—B. A. Gramm, Gen. Mgr., Gramm-Bernstein Co.

Knox

We stand ready to equip starters on any of our trucks, provided an owner desires it and is willing to pay something extra for it . Strictly speaking, any delivery type of vehicle makes more stops than a touring car in a day's routine, so that unless the motor is kept constantly running, it has a greater need of a self-starting equipment than the latter. Whether the motor is left running constantly or stopped every time the vehicle stops, a starting equipment ought to pay for itself after a certain length of time in the saving of gasoline or the time consumed by the driver in starting the motor as the case may be. We have made arrangements so that our regular electric starting and lighting equipment can be put on any of our commercial vehicles as well as fire apparatus and anticipate that there will be an increasing demand for this equipment, as it seems to us that there will be a logical need for it for the reasons given above.—Chas. F. Barrett, Adv. & Asst. Sales Manager, Knox Automobile Co.

Little Giant

We are contemplating equipping our Little Giant trucks with air self-starters, which will be manufactured and sold under the name "Little Giant" and our general reasons for this equipment would be the same general reasons as the pleasure car people advance in the sale of their cars when equipped with self starters, that is, convenience, saving of time, energy, etc., and which would be the more advantageous in a truck in view of the great number of stops and starts that the average truck driver has to make. When we are ready to install starters on our cars they will be furnished as optional equipment, with, of course, an increase in the price, providing the starter is desired. —Chicago Pneumatic Tool Co.

Mais

As to starters for commercial trucks, we believe that this is only another piece of mechanism for the driver of the truck to look after. Our one idea in building trucks is to make them as nearly fool proof as possible, and with as great simplicity as is consistent with good engineering. Our personal experience with self-starters has not been satisfactory, and we do not make them a part of our equipment, though we may have installed two or three upon the request of purchasers.

We do not believe that a self-starter as part of the equipment of a truck would add any to its selling value and would only entail an additional expense in the matter of up-keep. We do not think that the time and the possible saving in gasoline by reason of having a self-starter on the car would take care of the maintenance of a self-starter.—A. S. Lockard, Manager, Mais Motor Truck Co.

Mercury

We would state that we have given the subject of starters most careful consideration and do not believe that a starter is at all necessary, or advisable in delivery work, for which Mercury trucks were designed.

In the first place, no matter what may be said to the contrary, it means additional complication and many additional parts. One of our principal features is simplicity—or lack of complication—a small number of parts. A starter would also add additional weight and additional expense, which must be stood of course, by the purchaser. The purchaser of a delivery wagon will not ordinarily spend his good money for the convenience of a delivery boy or operator of a delivery wagon, unless he himself derives some benefit. The gasoline consumption of a small engine running idle, is so low that it is doubtful if anything could be saved by using a starter, considering maintenance and first cost of same. The engine is seldom stopped, excepting when the wagon is standing for some length of time, in which case the operator dismounts generally near enough to the starting crank to reach it. The motor is started with little physical effort. There is certainly no reason for a starter.—Mercury Mfg. Co.

Packard

The motor starter is an untried, undeveloped element in motor truck operation, and the mechanical troubles incident to the production of a successful motor starter on trucks loom up too large at this time to make the subject a vitally important one, in the writer's judgment. There are so many more vitally important things in truck operation than a motor starter that, in my judgment, the subject is not yet a timely one for agitation.

True, there is some undue waste of gasoline on account of the driver idling his motor from sheer laziness or ignorance and carelessness when he makes a stop, but the problem is one of the driver's education and with this desideration, the effectiveness of the starter would not be of considerable importance in a large number of cases.

In so many instances, the drivers' unions compel the truck owners to put a helper on the vehicle, and the driver has such a comparatively easy time that there is a lot of mis-spent, wasted sympathy for the driver who has to crank up his vehicle a large number of times per day. If the driver does not possess enough intelligence to care for his machine as it should be, the

writer does not see how it is possible to overcome any of the driver's troubles by giving him a delicate accessory to lighten his troubles—namely, the motor starter.

The practical, durable motor starter for trucks has not yet been produced. In time, it may come, but the time is hardly ripe for it, until we have overcome driver troubles to a greater extent than we have at the present time.—R. W. Hutchinson, Jr., Truck Transportation Engineer, Packard Motor Car Co.

Peerless

Tests of self-starters up to the present have not shown that the economy accomplished by their use is sufficient to justify installing upon our product. Of course, the motor truck being a purely business proposition, the use of the device is considered only with reference to the amount of time that would be saved in starting the truck and the amount of gasoline that might be saved through inducing the driver to stop the motor when the truck is standing still, instead of letting it run as he is likely to do if he has to crank it by hand.—W. R. Strickland, Chief Engineer, Peerless Motor Car Co.

Pierce-Arrow

The Pierce-Arrow Motor Car Co. is opposed to the use of the self-starter on motor trucks. The prime object of a truck is to carry goods at the cheapest cost. Anything that adds to this cost is detrimental to the success of the truck.

An efficient self-starter properly designed to stand up to the abuses of truck work would add considerably to cost of truck and would give no return if the driver were "on his job."

Many people imagine that a self-starter will start a motor where the drive cannot. This is not so, unless the motor is too big to be spun by hand. The average truck motor, however, can be spun easily by the average truck driver, and if the gasoline mixture is getting to the cylinder and the ignition is all right it can be started just as many times by the man as by the self-starter. If the mixture and spark are not right it cannot be started by either.

The whole problem therefore comes to this, that we are seeking to put on a device which does no more than a man can do and merely saves the time of the driver walking to the front of the motor and cranking it. The time he takes to do this is of course infinitesimal compared to the time he usually wastes in other directions, so that from this point of view the self-starter is unnecessary.

The other argument raised in favor of the self-starter is, that it tends to economize in gasoline. The driver is supposed to be encouraged by it to shut off his motor at a stop. This argument would have some weight if economy of gasoline consumption were alone vital during the idle periods. It is however, much more necessary to have the greatest economy observed during the running periods, and if the driver is encouraged to cut his gasoline bill down to a minimum while running, you will always find that he shuts off his motor when stopped. The establishment of a simple bonus scheme to reward the driver on a basis of fuel saved works far greater wonders than any self-starter.

It may be interesting to note that a gallon of gasoline will run an average truck motor "idling round" for over 3 hours. Not all motors will do this, but a good one will.

That is, for, say, 16 cents a day a driver may have one stop of 3 hours or three stops of one hour, twelve stops of 15 minutes each or thirty-six stops of 5 minutes each, his engine idling around all the time. This works out at about $48 per year to take care of the interest on the extra equipment, the extra maintenance, trouble and so forth. It hardly seems worth it to have all this extra complication of generator, motor, larger battery, wiring, special flywheel and so on (if electric equipment be used) to try and save $50 per year.

Besides it must be remembered that this equipment will render the motor more inaccessible for repairs, thus adding to the cost of repairs.

This seeming saving is reduced considerably owing to the fact that we have winter conditions for about 4 months in the year when the driver prefers to let his motor idle round to prevent his radiator from freezing and to keep his gasoline mixture warm for a good start.

The self-starter secured its success in pleasure cars owing to the fact that the chauffeur did not need to bring muddy feet and dirty hands into a car after starting the motor. It also eliminated the necessity of having to clamber over the side passenger to get into the driver's seat. The question of gasoline economy never entered into the advantages. These results, desirable enough from the pleasure car standpoint, are of absolutely no weight in trucks.

If the driver is encouraged to economize on his fuel consumption he will naturally stop and recrank his motor at every conceivable opportunity to increase his mileage per gallon figures.

We think, therefore, from the user's point of view, that the extra complication will more than offset any advantages gained by the use of the self-starter.—John Younger, Mechanical Engineer, Truck Dept., Pierce-Arrow Motor Car Co.

Speedwell

Our foremost reason for not favoring the application of starters to trucks is that we believe a truck should be made just as simple a piece of machinery as possible.

The driver of a truck is usually a man of entirely different type than the pleasure car driver. To be a successful truck man is to be of the rough and ready sort, husky, rather proud of the fact that he can spin his own motor and by no means an electrician, and the best starters do require some electrical knowledge at times.

On lighter trucks of pleasure car type chassis, starters might be desirable on account of their frequent stops, but on the heavier trucks the successful operation usually depends on long hauls and not so frequent stops, and we question very much whether the starter would not be detrimental instead of advantageous, disregarding entirely the increased original cost of the equipment and increased cost of maintenance.—P. W. Klinger, Chief Engineer, Speedwell Motor Car Co.

Stegeman

We do not favor equipping motor trucks with electric starters, on account of the expense which this attaches to the purchaser.

Purchasing trucks is a matter of economy and we fail to see where the starter would pay back its cost in saving. It is more or less a matter of convenience, which does not enter into the commercial field as yet.

If the starter can be brought to a reasonable figure and made practical, no doubt it will be used, especially on the lighter cars.—Jos. C. Millmann, Secretary, Stegeman Motor Car Co.

Stewart

To date we have had very few calls for starters, but we realize that it is only a question of time until there will be a demand for starters on commercial cars. It is our intention to arrange our design so that starters can be furnished as extra equipment when desired at an extra cost. In our opinion the principal objection to electric starters on commercial vehicles is in keeping the battery sufficiently charged on account of the frequent stops and starts.—T. R. Lippard, Manager, Stewart Motor Corp.

White

We have found from experience that most of the truck drivers will leave their motors running anyway, and the self-starter is an added complication to the truck that has to be looked after. The ordinary purchaser of a truck, we find, figures he can do a lot of starting by hand for the extra price that a self-starter on a truck costs.—Walter C. White, White Co.

Starter Gear Which Meshes Automatically

Eclipse-Bendix Device for Electric Starters Operates on New Principle

THE satisfactory connection of the electric starting motor to the gasoline engine to meet the peculiar conditions of the case has been one of the real problems in the automobile field since the electric motor was first thought of as a means of cranking. Among the conditions that make the problem difficult are that the motor must not remain in geared connection with the engine after the latter has commenced firing. If it does the speed will be such as to cause damage to the motor, electrically, due to excessive generation of current or mechanically, by ruining the bearings. Furthermore, to be a practical device this disconnection immediately after starting must be independent of the operator. Otherwise the accidental depression or retention of the starting pedal after starting had been actually accomplished, would put the machine out of use.

One method has been to include an over-running clutch in one of the gears so that the electric motor can apply power only until the engine commences turning at a higher speed than that represented by the gearing. This method is absolutely sure but it means that one member of the over-running clutch must remain in motion all the time the engine is running.

The other method of applying the starting motor is that of sliding a pinion into mesh with teeth on the periphery of the flywheel. By this arrangement there can be an absolute disconnection of the engine and starter when the engine is running. Figures show that this year the flywheel-pinion application has been adopted in more than double the number of cars than any other method. The necessary components of this type of starting mechanism are: a means of sliding the pinion interconnected with the starting switch so that both operations can be performed simultaneously, and a one-way clutch to protect the motor after starting.

There has recently been brought out a new method of applying the electric starter, shown in the accompanying illustration, known as the Eclipse-Bendix Automatic Transmission which needs no arrangement of levers to slide the pinion into mesh nor any over-running clutch. It is only necessary to operate the switch of the motor, and this can be done at the wrong time, i.e. when the engine is already running, without damage.

Pinion Meshed Automatically

The parts are few and simple. The armature shaft has a screwed extension provided with an outer bearing B and carries the pinion P. A weight W is solidly attached to the pinion and the latter is loose enough on the shaft to always occupy the position shown, with the weight underneath when the shaft is idle. The leading screw is a triple thread. On starting the motor the inertia of the weight W causes it and the pinion to be carried quickly along the shaft into mesh with the teeth on the flywheel where it remains performing the operation of cranking until the engine commences to fire, when the direction of the drive is reversed, coming from the flywheel to the pinion, immediately throwing out the pinion.

So far the action is easy to understand. But a query will naturally arise as to what would happen if the starting switch is not released and the motor continues spinning. It would seem that the pinion would again return and either get into mesh or continue chattering at the edges of the teeth. Neither happens. The pinion simply continues to rotate out of mesh until the switch is released. This is due to a secondary function of the weight W. Immediately the pinion is thrown out from the flywheel the speed of the motor is such as to cause a binding of the pinion on its shaft due to the one-sided position of the weight. The action involved is that of the center of gravity of the weight attempting to get into the central plane of rotation of the pinion and the slight necessary looseness of the pinion on the shaft allows a temporary binding as a result.

The spring S is simply to ease the shock of starting by permitting a slight play between the motor shaft and the screwed extension. The teeth of both flywheel and pinion are beveled on the entering side for easy engagement. As shown the motor is geared by a single reduction to the engine, but the device is equally applicable to a double reduction.

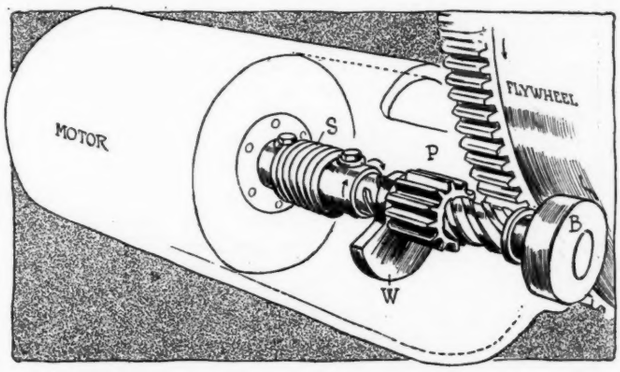
The Eclipse Machine Co. are the makers and Brandenburg & Co., Chicago, the sole selling agent.

Attention Required By Electric System

It is one of the claims for the electric system of lighting and starting for the automobile that less attention is required than for other installations. The motor or generator is not constructionally speaking a simple piece of apparatus but so far as reliability is concerned, after many more years of development than the automobile itself, its operation is more certain than other apparently simpler alternatives.

But, with all apparatus which comprises moving parts some attention is necessary. The very fact that attention is only demanded at rare intervals is one of the reasons that an electric system on a car runs a danger of absolute neglect. The attention necessary varies largely with the care used in the installation at the beginning. This is a point that is receiving more consideration on the part of the manufacturers as is evidenced by the improved methods of wiring noticeable on most of the 1914 cars. There is a distinct tendency to simplification of wiring with the double object of lessening the risk of short-circuit or other fault and of rendering easier the discovery of defects when these arise. Several makers are inclosing all lighting and battery leads in flexible metallic tubing with proper provision before insertion against the entry of moisture. The wires are then carried to a main fuse board which may also be the switchboard on the dash, centralizing all connections. Any fault can be found by testing with a voltmeter at this main distribution board. A system of this type practically eliminates the need of any attention to the wiring.

A little attention, however should be given to all the exposed live parts of the circuit such as the terminals on battery and other units, the contacts of the starting switch and the commutator. Any exposed parts of cable or terminal in the neighborhood of the battery should be occasionally coated with vaseline. The commutator should be kept clean by an occasional wipe with a rag and a little vaseline applied. This also applies to the care of the starting switch blade.



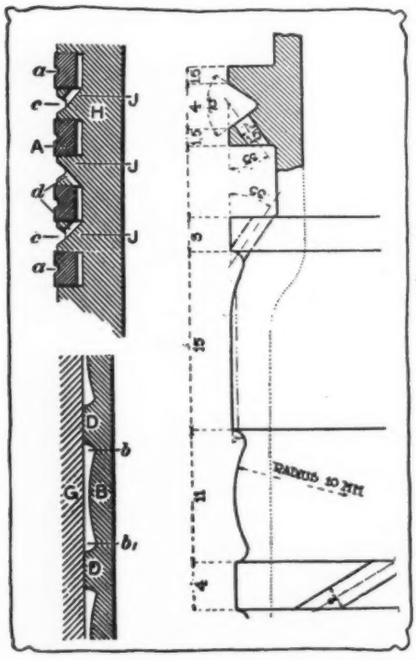
Eclipse-Bendix automatic transmission for applying to electric starting motors. The driving pinion slides in and out of engagement with the flywheel automatically on operating the starting switch

The Engineering Digest

Piston with Oil Grooves and Ducts Proved Slightly Superior for Power and a Great Saver of Oil

FOR some length of time the Trémolières piston has been in the French market, representing one of the very few attempts at improving the design of pistons with reference to other factors than weight and strength. It was described in THE AUTOMOBILE of Sept. 5, 1912, page 479, and is characterized by a system of oil-retaining recesses and ducts connecting these recesses with one another and with the grooves in which the piston rings are lodged. By tests conducted for the Automobile Club of France by Georges Richard, the well-known veteran among automobile builders, it has now been demonstrated that the Trémolières system does actually increase the motor power somewhat—this being especially the case at high motor speeds, if the test is unreservedly accepted—further, that it results in a very marked saving of lubricant and under most circumstances also in the avoidance of smoke from the exhaust.

In the accompanying illustrations, Figs. 1 and 2, the original formation of the piston wall is shown to the left, that of the upper portion with the piston rings above and that of the lower portion underneath together with an adjacent portion of the cylinder wall G, and to the right there is indicated on a larger scale a modification adopted for testing by Mr. Richard with a view to diminishing the vibrations of the motor—from which remark in the report of the test it may be inferred that the original Trémolières design was too heavy. The dimensions of the recesses and ducts are shown, in millimeters, by the numerals on the cut. The lower oil-retaining recess, which is not shown in this illustration, and which was similar to the other recesses in the original type, is in the modified form replaced by several smaller grooves. The central portion of the piston wall in the modified form has a lengthened contact surface with the cylinder wall, taking the place, it seems, of one recess and two short contact zones, D, in the original type.



Figs. 1 and 2—Construction of Trèmolières piston. Original to the left. Modified to the right. D, contact zones; bb', oil retainers

A bench test was made with a motor of 90 by 130 millimeter bore and stroke and force-feed lubrication. It was first equipped with ordinary pistons and its power curve was taken. Then the new pistons were fitted, the test resumed, and the curve was plotted again. Up to 1400 revolutions per minute a slight increase of power was shown and from 1400 to 1800 revolutions a much sharper increase.

[The report does not state in what manner this test was safeguarded. It is evidently conceivable that the oil sent to the Trémolières piston by a force feed system would not reach all the recesses and ducts until some time after the motor was started and that the full effect of the system would not be shown till then. Therefore, if the motor was in fact taken successively to the higher speeds without any deliberate preparatory running intended to bring the system into action, it is possible that the better showing made by the power curve at the high speeds was in reality misleading, comparatively, and that, for example, another test at low motor speeds made subsequently, after the shallow reservoirs on the surface of the piston had been filled up, would show equally superior results. The published report being silent on this point, it is thus made unsafe to infer or not to infer that a system such as that of the Trémolières piston should be supplemented by an arrangement for priming the piston with oil before starting the motor in order to get the benefits of the system from the beginning of each trip. Some light is thrown on this question by the results of the road test given in the following lines.—ED.]

The motor previously used was mounted on a four-seated car, torpedo type, and it was noted that the exhaust was smoky at the beginning, after the crankcase had been filled to such an extent that splash oiling took place. But after a run of 300 to 400 kilometers the reservoir was again filled to above the splash level, and yet there was no smoke from the exhaust thereafter. In running afterwards 25,000 kilometers with the same vehicle, no inconveniences were experienced and the oil economy observed was considerable. During a trip of 3000 kilometers, for example, a total of 6 liters of oil was used, while the average oil consumption of the same motor otherwise is about 1 liter for 100 kilometers.

After covering about 10,000 kilometers the motor was dismounted and it was noted that the piston pins presented no sign of wear or blackening and that the oil remaining in the crankcase, which had not been changed since the start, had remained very clear. The surface of the piston showed less marked traces of carbon deposits than those normally found.—From *Bulletin Officiel de la Commission Technique,* October.

Test of a Sleeve-Valve Motor with a Notable Oiling Device

AT the laboratory of the Automobile Club of France a sleeve-valve motor called the René-et-Bois was recently tested in accordance with the routine ordinarily followed for tests of motors submitted by the industry. Certain irregularities in the power developed at different speeds and in the corresponding figures for fuel consumption may be of interest to students of this class of motors. The construction peculiarities of the motor reside in the sleeve-valve and in the oil pump and are shown in Figs. 3 and 4.

A is the intake and E the exhaust port in the cylinder wall, and these ports are covered and uncovered by a split cast-iron ring B constituting the sleeve-valve. It is operated by means

of the piston *p*, Fig. 3, which in turn is controlled by a rocker arm C. At the moment of admission arm C pushes piston *p* downward, opening port A. During the compression and explosion stroke both ports are closed and the interior pressure holds the split ring against the cylinder wall, obviating leakage. The exhaust is opened by having the ring pulled back, the pressure of the gas assisting.

The motor has four cylinders of 65 millimeters bore and 110 millimeters stroke. The adjustment of the carbureter remained unchanged during the test, for which gasoline of .722 specific gravity at 26 degrees centigrade was used. The test figures, embodying the irregularities referred to, were as follows:

Revolutions per minute	Effective horsepower, metric	Fuel per hour, liters	Fuel per HP. hour
605	4.75	2.823	.429
897	7.6	3.351	.318
1316	11.95	4.848	.292
1895	14.44	4.925	.246
1759	14.44	6.148	.307
1439	11.78	6.821	.324

The end of the camshaft constitutes the cylinder of the oil pump, in which the piston P, Fig. 4, is actuated for its return stroke by spring R. At the end of the shaft an eccentric E acts against the roller G secured upon one arm of the bellcrank L. A lateral perforation O from the pump channel of the camshaft registers alternately with the oil intake *a* and the oil pressure channel *r*, these conduits being formed in the bearing-ring B in which the end of the camshaft is supported. It is readily seen that the bell-crank L pushes the piston into the position shown in the cut when the large portion of the eccentric is uppermost, while piston and spring at the same time rotate with the camshaft, but in this position of the piston the opening O should of course register with the pressure channel *r* instead of with the intake *a*, as erroneously shown in the illustration.—From *Bulletin Officiel de la Commission Technique*, October.

Omnibuses Made in France Make Money in New York City

DURING the year ending June 30, 1913 the Fifth Avenue omnibus line in New York City employed 105 French omnibuses and succeeded in writing off the sum of $130,920.59 while establishing a reserve fund of $142,941.45. Twenty-four new De Dion omnibuses were acquired. The tire cost per vehicle mile was reduced from 5 cents in 1911 to 3.3 cents in 1912 and to 2 cents in 1913.—From *Le Poids Lourd*, December 26.

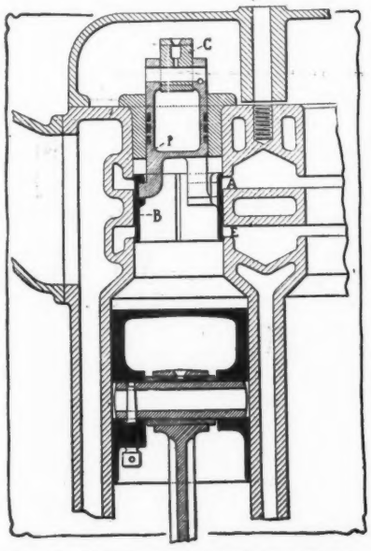


Fig. 3—Diagrammatic section of Renê-et-Bois sleeve-valve motor

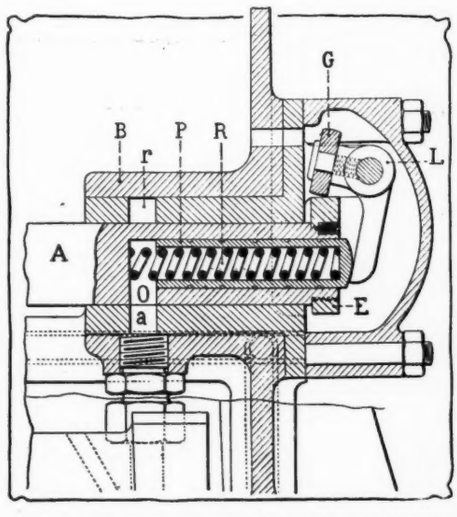


Fig. 4—Oil pump arranged in the end of the camshaft of sleeve-valve motor

The Drawing of Mechanical Parts for Illustration Purposes

AMONG rules for the drawing of illustrations which are recommendable with a view to reproduction and publicity, without clashing with the rules of the draughting rooms, the following may be mentioned:

It contributes greatly to clearness and a quick perception of the forms of the object if the hatching of large parts is open, that of small parts close and that of medium-sized parts medium, three grades being usually sufficient.

Lines should be of four thicknesses: (1) thin for hatching, broken and dotted lines and construction lines, (2) medium thin for contour lines at upper and left limits of a part and for intermediate lines denoting an intersection of surfaces, (3) medium thick for lower and right side contour lines of small parts and (4) heavy for lower and right side contours of larger parts.

Cross-sections of thin parts should not be hatched but blackened, provided the thin portion is not integral with other thicker portions which are also shown in cross-section.

For journalistic reproduction purposes it is preferable to have all reference lettering and numerals indicated in pencil only and to have the size of each drawing from two to three times as large, linear measurement, as it can be expected to appear in the pages of the journal.—With modifications from *Dingler's Polytechnisches Journal*, January 3.

Flame-Checking Screen in Carbureter Pipe and Its Uses

THAT it is possible to prevent all backfiring from the cylinders to the carbureter by means of a screen inserted between the throttle and the intake manifold has been shown by the tests made at the laboratory of the Automobile Club of France with the Gras "Isoflamme" device, the nature of which is shown in Fig. 5, the screen consisting in a plate with a large number of fine cylindrical perforations. Although the diameter of the pipe is considerably enlarged, in the manner shown, in order to accommodate this device, the results of the tests showed also, however, that it probably reduced the volumetric efficiency and the horsepower of the motor to which it was applied; in this case a 35-horsepower Aster motor. With the adjustment of the carbureter and throttle unchanged, three readings with the device in place gave, respectively, 1,035 revolutions per minute and 26.5 horsepowers, 1,043 revolutions and 27.3 horsepowers and 1,036 revolutions and 26.5 horsepowers. The timing of the admission valve was changed to produce backfirings, and about 100 of these occurred per minute without in any instance reaching the carbureter. Then the device was detached, and the motor now ran at 1,056 to 1,053 revolutions, giving a horsepower of 28.8. When the device was put back, the speed became 1,028 and the power 26. [It is not stated whether the timing of the intake valve was changed when the device was taken off, and this omission in the report leaves some doubt with regard to the value of the test, so far as the interference or non-interference of the device with the speed and power of the motor are concerned. As a flame screen at all events can be made of such dimensions as to reduce the volumetric efficiency of a motor, thereby increasing its flexibility, the test suggests its use for

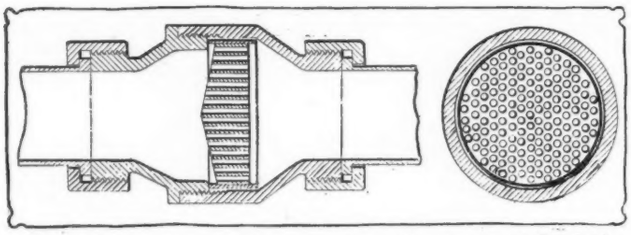


Fig. 5—Type of flame screen in carbureter pipe used for test

handily converting a car made with valve dimensions and valve timing best adapted for speed on the highways into one suitable for city traffic, the effect being in all respects similar to that obtained by valves of smaller dimensions, with the very desirable security against carbureter fires added.]—From *Bulletin Officiel de la Commission Technique,* October.

Production of Horses and Mules Undiminished by Myriad Motors

WHILE the number of horses in the cities of France, and especially in Paris, has been considerably reduced owing to the use of automobiles, the annual statistics show that the number of farm animals is practically unchanged. In 1912 there were 3,222,140 horses employed in farm work in France, as against 3,236,110 in 1911, and during the same year 50,000 horses were sold to the French and to foreign armies. Of mules there were 196,410 in 1912 and 194,040 in 1911, an increase of about 1,500. The number of donkeys fell from 360,590 in 1911 to 358,660 in 1912. Draft animals used in commerce and industry foot up a total of about 400,000.

Even if the great efforts which are now being made to supplant the draft animals on the farms by motor machinery were much more successful than they are, no great change in the number of these animals could be expected for years to come, as the cultivation of farms has been languishing for lack of human help much more than by reason of the cost of raising and maintaining the animals. The first result of the successful introduction of motor machinery on a larger scale would be the more intensive cultivation of farms and not a reduction of the live stock.—From *Le Poids Lourd,* December 26.

Adjustment of Steering Gears and Brakes in Some New French Models

WITH regard to the adjustment of steering gears to compensate for wear a difficulty arises from the fact that the surfaces which are in wearing contact most of the time, and which therefore wear most, are those engaged when the car is running straight ahead—and yet all the time swerving a little now to one side and now to the other, so that these surfaces are seldom absolutely at rest. The surfaces engaged at pronounced changes of direction are worn much less. When therefore an adjustment is made to take up the play between the surfaces which are worn most, the result is inevitably that the unworn surfaces will stick or pinch at sharp turns. For this reason most constructors confine themselves to taking up the play in end-thrust bearings and make the working surfaces of the gear so large that, with a carefully studied lubrication, it will be a very long time before the wear which must eventually take place can result in objectionable looseness in the steering action. All who employ the worm and sector combination must fall back on this system. Other constructors provide a design by which the wear must be uniform for all positions of the gear, as may be done by employing a screw and nuts, provided the threadings of the screw and of the nut, or nuts, are of equal length and are both fully engaged in the position giving straight-ahead driving, and provided, also, that the end-thrust from screw thread to nut thread is uniformly distributed, taking place in the direction of the axis of the screw, or approximately so.

A steering gear conceived on this plan is incorporated in a recent Clément-Bayard model. Two views of it are shown in Fig. 6. The shaft M, secured to the steering post, is threaded for a portion of its length and is formed with two grooves at its lower end. The hollow screw E is splined to this portion, susceptible of longitudinal adjustment. The two nuts F and H, which are alike, are mounted, respectively, on the threaded portion of M and on the nut E. These nuts are flanged to abut against the sliding blocks N and O, which on the side opposite to the plane surface are formed as a hollow arc to ride on the edges of the eccentric disks P integral with the shaft whose rotation controls the movements of the vehicle wheels. The side view—with one half of the casing removed—shows the space, between the blocks N and O and the casing, to which the sliding motion of N on F and of O on H is limited. The cup A is screwed into the upper opening of the casing, bearing against a flange on shaft M, and by its adjustment the threads of the nuts and screws can evidently be maintained in uniform contact on the working side of the threads, since the nut E abuts against the bottom of the casing. Cup A is provided with notches at its top by means of which and a pawl piece it can be secured in the desired adjustment. End-thrust roller bearings between the gear casing and the steering post are said to be provided.

When M is turned, the two screwthreads are turned the same angle and the nuts F and H are moved in the same direction and the same distance, up or down, carrying with them the eccentrics on shaft P, in which the up or down movement is transformed into a rotary movement around the axis of P through the intermediation of the sliding blocks N and O. The steering arm is keyed to shaft P, apparently by pressure upon the conical shaft-end shown in the illustration. While the thrust between screwthreads is not quite in line with the axis of M, excepting in the position for straight-ahead driving, the deviation is so slight as to be insignificant. Adjustment can be made without opening the casing.

[On the other hand, the sliding action between N and O with relation to F and H must be unfailingly safeguarded by the lubrication.]

Adjustment of Brakes

While little has been done as yet to make the brake-actuating mechanism, so far as the wheel brakes are concerned, entirely independent of the action of the vehicle springs—an unusually heavy load or a sharp upward movement of the rear axle at the

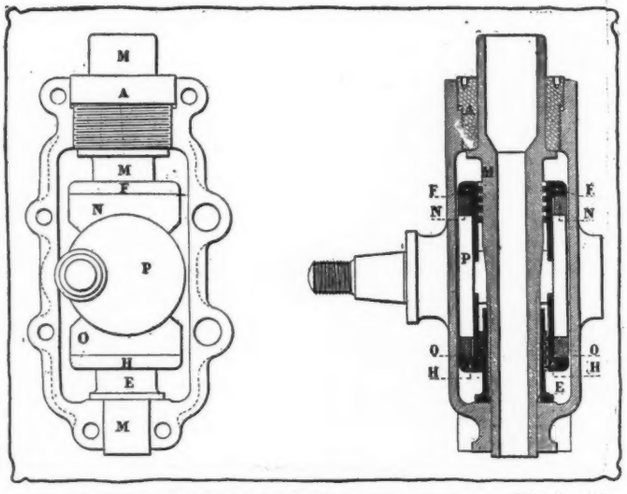


Fig. 6—Adjustable Clément-Bayard steering gear

moment when the brakes are applied rendering it necessary to push the brake lever a little farther to obtain a given brake pressure—improvements are being introduced tending to make the adjustment of the transmission brake very convenient.

In one of the Renault models the mechanism is that shown diagrammatically in Fig. 7. The pedal arm P is mounted idly upon shaft A but is held in secure and adjustable relations to it by means of the screw M meshing with the mitered gear teeth of sector S, and the shaft A actuates by bevel pinions shaft K which in turn operates the brake cam. The screw M, secured by spring R as well as by the irreversible nature of a worm gear, can be turned by hand, thereby bringing the pedal in the desired relation to the brake action.

In Hotchkiss cars the adjustment of brake rods is facilitated by a block R, Fig. 8, forming a union joint for the oppositely threaded rods TT; and the lever M, which ordinarily rides over the squared portion C, locking the adjustment, is used as a handle for turning block R around when adjustment is required.

In a Pilain car the brake pulley F is secured upon the secondary gear shaft and the brake shoes MM are drawn together around it by a screwbolt with opposite threads operated by a rack connected to shaft X by rod T and lever L. The main point is that the pedal arm P is not keyed to shaft X but is held in adjustable relations to the plate A which is keyed to the shaft, by means of the screwbolt V, the scalloped nut B and the strong spring R, on the plan shown diagrammatically in Fig. 9.—From *La Vie Automobile,* December 27 and January 3.

Protective Coats and Colorations for Exposed Aluminum Parts

BY extensive industrial use of aluminum it becomes recognized more and more that this metal stands in need of a protective coating almost as much as iron or steel. *Zeitschrift für Feinmechanik* gives some suggestive details on the technique which is being developed with this purpose in view. The matter of providing an attractive coloration of the aluminum at the same time is also considered.

By means of chloride of mercury a superficial amalgam of the aluminum is produced, and this is strongly oxidized. Without interrupting the oxidation, a soluble salt, such as a chromium salt, is spread as a coating over the surface, by a brush or by immersion, and the article is then brought to a red heat. The oxidation and the heat combine to make the chromium salt form a precipitate intimately united with the oxidized film of the metal, and as this precipitate is combustible it adheres also firmly to the metal underneath.

A very similar process can be undertaken with solutions of metallic chlorides, which are more readily reducible than the chromium salts. By the choice of the materials, the degree of oxidizing and the temperatures employed, shades varying from a light green to gray, brown and black can be obtained, but the details in this respect are still matters of mere practical experience. It is known, however, that alloys of aluminum take colors which could not have been anticipated from the color of the metal used for producing the alloy, in each case. An alloy of aluminum with platinum is of a changeable purple hue; one with a cobalt or nickel is yellow and one with palladium is a deep rose.

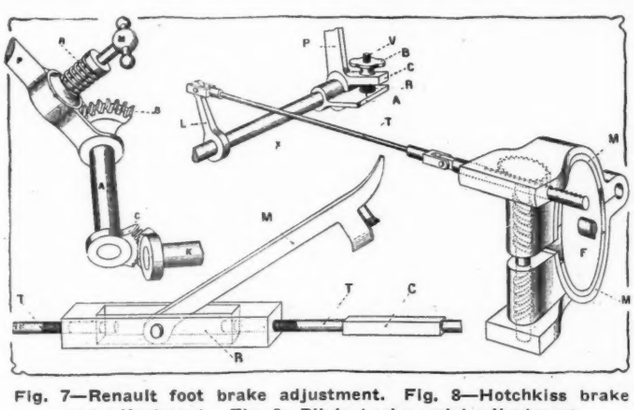


Fig. 7—Renault foot brake adjustment. Fig. 8—Hotchkiss brake rod adjustment. Fig. 9—Pilain brake pedal adjustment

For producing a pretty mat black the journal mentioned recommends the following process: A bath is prepared containing 150 grams of bichloride of antimony, 100 grams of nitrate of manganese, 20 grams of graphite, 250 grams of hydrochloric acid and 1 liter of 90 per cent. alcohol. The aluminum is first pickled in sulphuric acid diluted with 1-3 of water and is then immersed in the bath at a temperature of about 35 degrees centigrade. The alcohol is lighted and allowed to burn out, and this leaves a grayish deposit which makes an excellent foundation for a black varnish which is dried on in an oven and over which there is subsequently spread a coating of linseed oil varnish.—From *Le Génie Civil,* December 20.

Conditions for Second German Competition for Aeroplane Motors

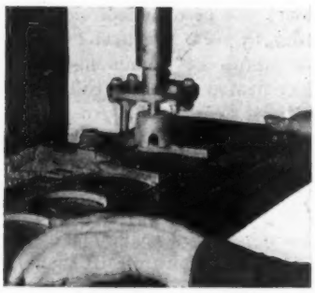
THE tests for the second German Kaiserpreis of 14,000 mark and 10 prizes, each of 4,000 mark, differ from those provided for the first competition which took place at the opening of 1913. The assessment of the motors is to be on the same basis as before, the fundamental number being the sum of the weights of the motor and of the fuel and oil wanted for the test runs, divided by the effective horsepower. But other features are to be taken into consideration as well, and it is not intended to settle by this competition whether preference should be given to water-cooling or to air-cooling; the first prize may be divided between two motors of the two types. The power must range between 80 and 200 horsepower. The motors are to be run for 60 hours, and additional tests may be conducted under special conditions. The ordinary testing is to be carried out in two periods of ten hours and eight periods of five hours, to be separated by intervals varying from two to five hours. During these intervals such repairs may be effected as can be done by the pilot and his mechanic on the machine without the assistance of a workshop. The tests are to commence in the fall of 1914.

New Compound for Blackening Metals

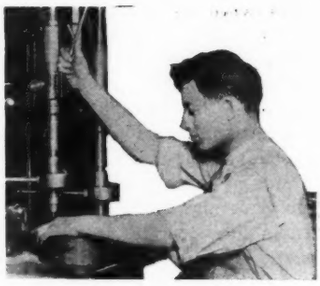
FOR imparting a lasting black coating of mat luster to parts made of any of the reddish varieties of brass, to copper, gun metal and most bronzes, among which phosphor bronze and manganese bronze, *Elektrochemische Zeitschrift* for December recommends to dissolve 5 kilograms of caustic hydrate of soda in 100 liters of water, bringing the mixture gradually to the boiling point of water, 100 degrees centigrade, and then to add 1 kilogram of powdered persulphate of potash. The article is suspended in the hot solution for 7 to 10 minutes, is then rinsed in clean water and dried in sawdust.

In the case of aluminum-bronze or kindred light bronzes, the lye must be concentrated; that is, 10 kilograms of caustic hydrate of soda must be dissolved in 10 liters of water and the 1 kilogram of persulphate of potash is added to this smaller quantity.

The December issue of the Bulletin of the Permanent International Association of Road Congresses, published at 1 Avenue d'Iéna, Paris, contains much illustrated information on the use of bituminous binders in road construction. Membership in the association costs 30 francs ($6) for 1914, 1915 and 1916. The Bulletin comes in English, if desired.



The Rostrum



Believes Small-Bore High-Speed Motor Will Last Longer Than Slow-Speed Type

EDITOR THE AUTOMOBILE:—Having read the articles which have been appearing in THE AUTOMOBILE'S recent issues on motor types, I take the liberty to state my views on the subject.

I believe that the small motor, when not overloaded with superfluous weight, has greater lasting qualities than the larger slow-speed type. For an explanation of this point I refer the reader to L. H. Pomeroy's article on high-speed motors, in the issue of December 11.

That the light car with a small-bore motor is far the more economical in both tires and fuel is a proven fact.

A certain six-cylinder car which has been recently announced using a small-bore, high-speed, poppet-valve motor, claims to get from 20 to 22 miles to the gallon of gasoline in city running. While a certain agent selling a Knight-motored car using the medium speed, four-cylinder type of motor, with only nine cubic inches more piston displacement claims to get 14 to 15 miles. The six referred to is, I believe, slightly lighter, but the Knight motor claims high efficiency. These figures seem to point to the high-speed motor for economy in operation.

Another six-cylinder car with a medium speed motor, having 52 cubic inches less piston displacement than the aforementioned six, and weighing about the same, claims only 14 to 17 miles to the gallon of gasoline. There again is shown the economy of the high-speed motor.

There are many men who would be willing to pay $2,500 to get a good car, but how long would they stand for the 10 to 15 miles to the gallon and high tire expense of the average high-power heavy car selling around that figure? There are many who could part company with that amount for a car but who could not stand the strain of the up-keep.

While the cost of gasoline in America is low compared with on the Continent, is that any reason why we should contribute those extra dollars in up-keep to the Standard Oil Co., when with a more economical motor we could keep those extra dollars in our own pockets?

In the face of these facts, I don't see how any one can cling to the big, heavy, slow-speed motor, unless he is the same type of man who prefers to jog along behind a horse when he could afford an automobile. In other words, he is behind the times.

Nashville, Tenn. W. L. MCFARLAND.

Two-Bearing Crankshafts for Small Motors

Editor THE AUTOMOBILE:—From what I have observed, most motors rated at say from 20 to 30 horsepower support their crankshaft by three bearings, while a certain car I have in mind, rated at 25 horsepower whose four-cylinders are 3.625 by 4.5 inches has only two bearings. These bearings are 1.875 inches in diameter, the front being 2.5 inches long and the rear 3 inches long.

Kindly tell me if these two bearings, if properly constructed of the right material, will give durable and efficient service?

2—Also, is it necessary that oil in its circulation from the reservoir be strained before it enters the crankcase again, or can this only be termed an advantage.

Tallmadge, Ohio. OLIVER A. FENN.

—1—A two-bearing crankshaft is all right for a motor of this size. Two-bearing crankshafts have been used extensively for the past 5 years on four-cylinder motors up to about 4.25 inches bore and have been found very satisfactory, but this construction is not used on larger motors because the distance between the bearings becomes so great that a crankshaft of very large cross-section and great weight must be used in order to insure stiffness. The two-bearing design is favored, for small motors, because the overall length of the motor is reduced and the cost of manufacture lessened.

2—An oil strainer is not essential to the working of the lubrication system although there is a slight advantage in having one. It is generally made of fine mesh brass gauze and its function is to catch coarse particles of foreign matter such as chips of metal, dust and grit that would score the bearing surfaces of the motor. The strainer, however, will not take out the finely suspended particles of carbon that result from the wearing of the oil in the bearings.

Uses One Gallon of Oil Every 30 Miles

Editor THE AUTOMOBILE:—I have a 4-50 Palmer & Singer car that uses about 1 gallon of cylinder oil about 30 miles. I have had the bottom of the crankcase off, found the oil wells open, and put it on right. I then removed the front gearcase, but found no trouble and replaced it, but no good results.

The motor runs slow or fast giving a good spark and firing every time, thus giving amount of power desired, only giving a small amount of smoke when engine is raced.

Would the breathers cause this loss of oil, by being covered with 60 gauge wire, or may the vacuum become so great that oil would be forced out with air?

Swedesboro, N. J. Jos. H. Bolton.

—An oil consumption of 1 gallon for every 30 miles without causing the motor to smoke must be due to a leak in the crankcase. There is no other way to account for it. There is no possibility of the oil getting out through the breathers. Inspect the oil pump and connections for leaky joints and also look over the crankcase bottom and you will undoubtedly find where the extra oil is going to.

Reader Builds Novel Car

Editor The Automobile:—Having noticed that several of your readers have submitted sketches of ideal cars, I decided to send you a sketch of a car Fig. 1, which I built this winter.

This car was formerly a touring car with a 4 1-2 by 5-inch motor. Last year I built it into a raceabout, and this year decided to build something exceptionally novel. In making the body I used 3-8-inch cypress, 18 inches wide, and formed it to the frame and ribs, similar to a boat. It is reinforced with iron standards and bolted throughout with large headed step bolts.

The gasoline is carried in a 10-gallon tank in the cowl. On the rear is a scuttle door that opens into a tool box and luggage apartment. It is upholstered with the leather taken from the old touring body. The top which is of my own design is but 38 inches wide and very low. The Presto tank is carried in the bottom of the front seats, and is turned on through a small scuttle hole in the side of the body.

Other noticeable features are the 37-inch solid wheels and open exhaust ports. These are opened and closed from the driver's seat by a butterfly valve in each port. The car is painted bright orange trimmed in black, and is very attractive.

Talbot, Ind. Don Erskine.

Running a Four-Cylinder Motor on Three

Editor The Automobile:—Is there any good reason why a four-cylinder motor should not or could not be run with three-cylinders, should one piston be left out for repair? I have tried it with mine and failed to make it run. I made the order of cylinders one, three and two, number four being out of commission.

Interlachen, Fla. J. W.

—It is possible to operate a four-cylinder motor on three cylinders although it is hardly advisable excepting under extreme circumstances. The spark timing should be left the same as when running on four. With one piston removed the motor will be badly out of balance especially at high speeds and it will only develop 75 per cent of its full power but there is no reason why it should not run providing the firing order is unchanged.

Description of Speedwell Rotary Valve

Editor The Automobile:—Will you kindly publish a description of the mechanism of the Speedwell rotary valve?

2—Is the valve set in anti-friction bearings?

3—How is expansion taken care of?

Newark, N. J. H. J. Anderson.

—1—The mechanism of the Mead rotary valve that is used on some of the Speedwell cars is illustrated in Fig. 2. Separate valves are employed for the intake and exhaust and these are of the sleeve type. Slotted passageways in the sleeves register at the proper time with ports in the cylinders to give the intake and exhaust openings. At the left a vertical section through one of the cylinders is shown indicating the position of the valves when the intake port is open.

The method of driving the valves is illustrated at the right. It will be noted that a double reduction between the crankshaft and the sleeves is employed, a construction that is found necessary because the valves rotate at one-quarter the speed of the crankshaft. This feature is contrary to usual practice in valve drive but is necessary because a valve opening occurs every half revolution of the sleeve. Silent chains are employed and an idling roller is used to take up wear.

The construction of the valve is shown at the bottom of the figure. The sleeve is divided in two parts, connected by a coupling, to facilitate its removal.

2—No, the sleeve runs on the surface formed by the bore in the cylinder casting.

3—As separate valves are used for intake and exhaust, the expansion of the former is very slight. The expansion of the exhaust valve is taken care of by making the clearance great enough to allow for it but even the increase in diameter of this valve under heavy load is not great because its diameter is small and its temperature never becomes much greater than that of the cooling water. It is claimed that the clearance on both valves is so small that a film of oil completely fills the space at all times.

Explanation of Axle Shaft Breaking

Editor The Automobile:—I have an Otto car model K. K. the latest type, and have a great deal of trouble with the shaft in the back axle breaking. Will you kindly let me know the cause and a cure for this trouble?

Merchantville, N. J. W. W. MacCallum.

—The principal causes of breakage of a rear axle shaft are: defective material and misalignment of the housing. If only one shaft has given away it is probable that the trouble was due to a flaw but if two or more have broken in succession the difficulty must be due to the housing being bent out of line as it is hardly possible that more than one shaft could be defective. If the housing is out of true it would bend the shaft and the

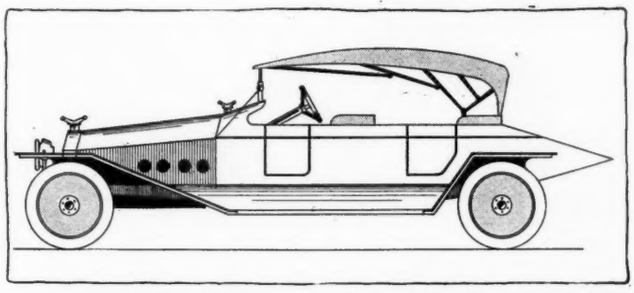


Fig. 1—Novel car built by reader has a streamline body without any curves. The top is only 38 inches wide. Free exhaust is afforded by the ports in the hood. The wheels are made solid, thus adding to the effect produced by the unusual body design

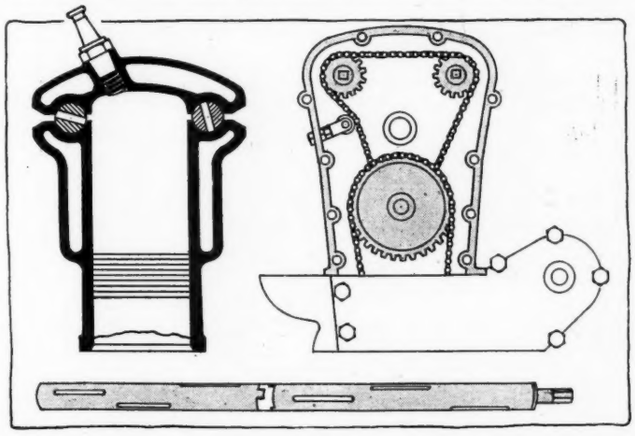


Fig. 2—Left, vertical section through Mead Speedwell rotary valve motor, showing position of the sleeves when the intake is open. Right, a double reduction silent chain drive is used for operating the valves. The idler roller gives adjustment for wear. Bottom, valve sleeve, showing slots through which the gas passes

rotation of the latter would cause a strain at the point of flexure that would in time so weaken the metal that it would give way.

Another explanation of your trouble might be that the plane of the wheel rim is not in line with the hub so that the wheel wobbles and sets up a strain near the axle end that eventually results in a breakdown.

A Horsepower Chart, Including Stroke

Editor THE AUTOMOBILE:—In your next issue will you please give any formula you may know of for figuring horsepower in which the length of stroke is taken into consideration?

2—I have heard of the Marshall & Denby formula but cannot find anyone who can explain how it is figured. Do you know?

Taunton, Mass. A READER.

—1—A simple chart for obtaining the horsepower of a motor when the bore, stroke and revolutions per minute or piston speed are given is shown in Fig. 3. In using this chart, first select the stroke at the left of the lower chart, then move along horizontally until the diagonal representing revolutions per minute is reached, then travel up to the diagonal representing bore and from there to the right to the scale that gives the horsepower. The heavy dotted line shows how the horsepower is found for a 4 1-2 by 5-inch motor running at 1,400 revolutions per minute. The diagonals on the lower chart represent piston speed as well as revolutions per minute.

When the maximum output of a motor is wanted, and the speed corresponding to this output is not known, a fairly close approximation can be arrived at by assuming that the greatest horsepower that it is capable of giving is delivered when the car is running at its maximum speed. This is not strictly true, of course, because a car might have a motor that was so small that the car speed at which the motor would give its maximum output could never be reached. But it is sufficiently close for the purpose.

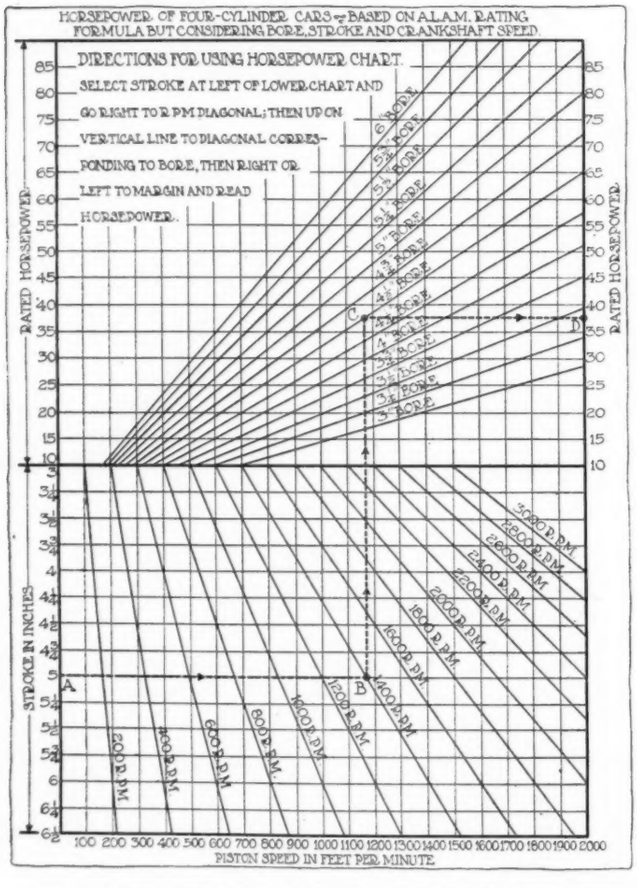


Fig. 3—Horsepower chart taking into consideration bore, stroke, and revolutions per minute or piston speed. The method of using the chart is clearly illustrated by the broken line. First select the stroke at the lower left side and then move to the right until the line representing revolutions per minute or piston speed is reached, and then go up to the diagonal representing bore and then over to the horsepower scale

Then, assuming that the maximum car speed is known the corresponding speed of the engine is expressed by the formula:

$$\text{r. p. m.} = \frac{\text{gear ratio} \times \text{car speed in m. p. h.}}{\text{wheel diameter in inches}} \times 337$$

2—THE AUTOMOBILE knows of no formula by that name.

An Easy Way to Straighten Axles

Editor THE AUTOMOBILE:—Here are two repair kinks that may be of interest to the readers of THE AUTOMOBILE and may help them out of difficulty when they have similar repair jobs to do. The first one relates to straightening an axle or similar part and the second to a cylinder flange repair.

Where it is desired to make bends in heavy pieces that must not be heated in bending and that require considerable force to effect the bend it is sometimes difficult to hit on a method that will do the trick in shops not equipped with a machine made especially for bending.

In shops equipped with a planer the planer can easily be converted into a bending jig as shown in Fig. 4. I have made use of a planer in this way several times in straightening automobile axles. Wooden blocks and a screw jack, placed as shown, do the work very well.

Where considerable bending is to be done a still more convenient outfit can be made by strapping the screw jack up-side-down onto the planer head so that it will always be in place without moving every time it is needed.

Of course, a planer is not the only machine that can be used in this way. Any strong, rigid structure, that will allow the placing of blocks and a jack as illustrated, will do the trick.

It is not uncommon for breakages similar to that shown in Fig. 5 to occur. Sometimes they are caused by careless blows from a hammer, sometimes by improperly forcing the plate into position, and again on account of uneven machining of either the upper plate or the crankcase.

I had a break like the one shown, not long ago. The attaching plate and cylinders were all cast in one piece. The owner wanted a quick job, as usual, and so I fixed it up as quickly as I could in the manner indicated in Fig. 5. The bent strap was made of 3-8-inch wrought iron and 3-8-inch longer studs were used in the three holes covered by the strap.

The piece that was broken out was lost, so I could not replace it or substitute another piece without considerable additional expense, so I let it go. It would have been much better, certainly, if that space had been refilled, for which babbitt metal would have served very well, but in any case the strap could not have been properly eliminated.

Where the break is on the side, as sometimes happens, the repair should be made in a similar manner, that is, with the strap covering three holes.

New York City. W. F. S.

Suggests a Toy Automobile for $100

Editor THE AUTOMOBILE:—It seems to me that there is a big field for a self-propelled automobile for children. In this day of the self-starter, some appliance of this kind might be used to run a toy car that would be suitable for children to ride around in. Either a storage battery in connection with a self-starter motor might be used for the propulsion of the vehicle or else a heavy spring such as is used in spring starters could be employed. The greatest drawback, I can see, is the cost which would be somewhere between $100 and $200, although it might be possible to produce the spring type cheaper.

2—Is it possible to adjust a car so that it can be absolutely depended upon not to kick back when cranking on the batteries? Presupposing, of course, that all wiring connections are in good

condition, the timer all right and the operation of cranking carried out correctly.

Brewton, Ala. E. M. Blacksher.

—1—The greatest objection to the toy automobile is not its cost, because it would be possible to make a good one for $100 and there is quite a large class of people that would not mind spending this amount for one, but the danger attached to its operation and the possibility of an accident occurring, would deter most people from putting such a toy in the hands of their children. The risk in giving a child such a toy would not be due to the intrinsic speed of the machine because this could be low, but to the possibility of collision with larger vehicles and to the speed that the machine might attain in coasting down steep hills.

However, in order to construct a practical machine and keep it within the hundred dollar limit neither a storage battery nor a spring would be a satisfactory source of power. The former would be too costly and the latter would not drive the toy very far before it would need winding up and this would be too laborious to ever make such a car popular. However, it would be quite feasible to use an air-cooled motor of about 1-2 horsepower.

To build a small automobile for $100, or less, would require that the simplest construction be used throughout. A wooden body and frame, and wooden wheels with plain steel bearings and solid rubber tires would need to be employed. A speed changing device of any kind would be out of the question. A belt drive to one rear wheel would probably be the cheapest and most satisfactory method of power transmission and a clutching action could be obtained by tightening the belt. Lever steering should be used in connection with a fifth wheel construction on the front axle. Simple brakes acting on the rear wheel rims should be employed. Such a car could easily be built for $100.

2—Under the conditions you have imposed it is hard to see how a motor could kick back, because back kicking is due to one of three causes: ignition apparatus timed to give too early a spark; spark lever left in advanced position; a short-circuit. As you have eliminated all these possibilities, a kick back is impossible.

Information on New National Six

Editor The Automobile:—Can you answer the following questions relative to the National six that is just out?

1—What power is claimed for the motor?

2—Who makes the motor, transmission, axle?

3—What is the width of face of the transmission gears?

4—What make starter is used, what magneto, what carbureter?

5—What make bearings are used in wheels, transmission and differential?

6—Where is the gasoline tank?

7—What is the gear ratio on high, second and low?

8—What is the wheelbase?

9—What is the weight?

10—What method of lubrication is used in motor? What is oil capacity of reservoir?

Youngstown, O. James A. Ewing.

—1—The S. A. E. rating of this motor is 33.75 horsepower although on brake test 58 horsepower has been developed.

2—The motor is a National design made by Brandenburg & Co., makers of Buda motors. The gearset is turned out by the Warner Gear Co., and the rear axle is a product of the National factory.

3—The face of the change speed gears is .875 inches.

4—The car is equipped with a Deaco starting and lighting outfit, a Rayfield water-jacketed carbureter and a Remy magneto of the new type.

5—Imported Schafer annular bearings are employed in the gearset and roller bearings made by the Standard Roller Bearing Co. are found in the axles.

6—The gasoline tank is hung at the rear except on the runabout.

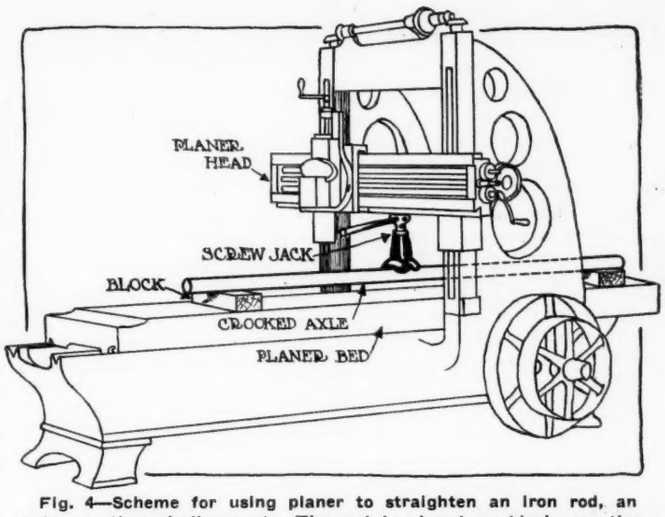


Fig. 4—Scheme for using planer to straighten an iron rod, an axle or other similar part. The rod is placed on blocks on the planer bed, then a jack is inserted as shown, and by operating the jack the necessary force to straighten the rod is obtained

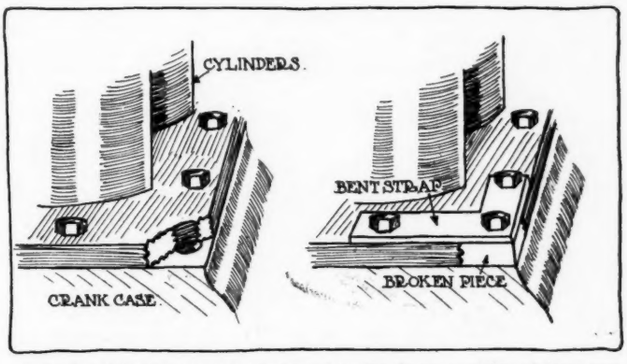


Fig. 5—Cylinder flange repair, showing how a strip of iron can be used to take the place of a piece broken out of the casting

7—The gear ratio on high is 4.08 to 1 and on second 7 to 1.

8—The wheelbase is 132 inches.

9—The weight with touring body is 3400 pounds.

10—A combination force feed and splash lubrication system is used, the oil being carried in a 3-gallon reservoir.

The Causes of Poor Compression

Editor The Automobile:—I have a car that has run nearly 40,000 miles. A few months ago I had new rings fitted to the pistons because the engine had lost compression. The cylinders are not scored. Although this has been improved, somewhat, I find that the car does not develop the right power, especially on the hills. I would like to know if the trouble could be caused by worn timing gear wheels?

Platte, S. D. C. Vanderboom.

—Worn timing gears would not influence the timing appreciably so that the lack of power must be due to some other cause, however if there is much play in them new ones should be fitted if a silent motor is wanted.

The fact that the compression is low indicates that this condition is more or less responsible for the poor performance of the motor. It may be that the rings were not properly fitted: they should be carefully lapped in with ground glass and oil until they give a perfect fit.

The lack of compression may be on account of carbonized or pitted valves and if so they should be ground until a smooth, tight seat is obtained. Valve tappets out of adjustment, so that the valves do not come down tightly on their seats is a very likely cause of trouble. There should be enough space between the tappet and the valve stem to insert a calling card when the valve is closed.

The Gasoline Trucks of 1914

(*Continued from page 249.*)

wheelbase and furnished in standard form with either panel or express body.

Superior

One of the most recent additions to the list of 1-ton trucks on the market is the Superior, made by the F. G. Clark Co., Lansing, Mich. This vehicle is a motor-under-bonnet assembly of standard parts, has right steer and control, is chain driven and fitted with solid tires. A 4.125 by 5.25 Rutenber engine is used. The wheelbase of 110 inches allows loading platform from 105 to 132 inches in length to be used.

Tiffin

The Tiffin Wagon Co., Tiffin, O., which has long been a maker of farm wagons and the like, has entered the truck field with a couple of models—1,200 and 2,000 pounds capacity. They have motors under forward hoods and drive to the rear through jackshafts and silent chains. The lighter vehicle is fitted with a 25-horsepower Buda motor, 3.75 by 4.5, while the larger has a Continental 30-horsepower 3.75 by 5.25. The wheelbases are 112 for the 1,200 pound and 128 for the 2,000 pound.

Transit

Made in 1, 2, 3 1-2 and 5-ton sizes, the Transit trucks, offered by Transit Motor Truck Co., Louisville, Ky., are assembled from standard parts and are of the type wherein the power plant is beneath the drive cab. They are all made along the same design, having jackshafts and chain drive to the rear wheels and most other standard features. The two larger sizes give from 14 to 16 feet load space, while the 2-ton affords from 12 to 14 feet and the 1-ton, 10 feet 8 inches.

United States

The U. S. trucks, product of the U. S. Motor Trucks Co., Cincinnati, in 2 and 3-ton capacities are conventional designs with the motor in a forward hood and driving back to the rear through chains and jackshaft. The smaller has a 4 1-8 by 5 1-4 engine and the 3-ton a 4 1-2 by 5 1-2. The wheelbase of 132 inches on the 2-ton and 144 inches on the 3-ton give plenty of body room.

Universal

In addition to continuing its 1 1-2 and 3-ton models, the Universal Motor Truck Co., Detroit, has added a 5-ton type which conforms to the same general design as that of the 3-ton. It has chain-drive from a jackshaft and makes use of a Continental 5 by 5.75 motor. The steer and control is on the right. In the 3- and 5-ton Universal construction, the motor is under the seat with the radiator back of it. The 1 1-2-ton is a worm-driven type with the 3.75 by 5.25 engine under a forward hood. Its control is in the center and left steer.

Velie

Besides carrying through its 2-ton and 3-ton trucks as previously built, the Velie Motor Vehicle Co., Moline, Ill., has a new model of 1-ton capacity. This truck departs from the transmission construction of the older models in that the drive is by shaft to the rear axle instead of by the use of a jackshaft and side chains. It has a 4 5-8 by 5 1-4 engine which is under a bonnet forward of the driver's seat. Left control and center steer are incorporated The car is fitted with pneumatics and the maximum body length is 129 inches, the wheelbase being 129 also. The larger trucks, both of which have a 4 1-2 by 5 1-2 motor under a bonnet are furnished in two wheelbase lengths—148 and 172 inches.

Vulcan

A comprehensive line of trucks is made by the Driggs-Seabury Ordinance Corp., Sharon, Pa., and in these which go under the trade name of Vulcan, no changes whatever have been made for the current year. The capacity ratings are 2, 3, 4, 4 1-2, 5 and 7 tons, and the wheelbases to correspond are 144, 150, 162, 162, 162 and 156. The motor which is a 4.375 by 5.5 for all models save the 7-ton which has a 4.75 by 5.5, is placed forward.

Wagenhals

The Wagenhals company, Detroit, Mich., has long been an exponent of the three-wheeler for light delivery work. The car has a capacity of about 800 pounds, and the load carrying part is forward of the driver's seat. Two wheels with a tread of 58 inches are placed at the front and one at the rear. These are mounted on a triangular main frame from which a sub-frame carrying the body, power plant and seat are suspended by four half elliptics. The motor is mounted transversely just forward of the drive seat and drives through a planetary gearset to a single chain which propels the rear wheel.

Walter

For the current year, the Walter Motor Truck Co., New York City, will push the front wheel drive models which it introduced to this country about a year ago and which are constructed along the lines of the Latil, a French machine. But to meet the demand of purchasers who do not want the front drive type, the Walter company also markets a comprehensive line of conventionally driven trucks with jackshafts and side chains. These are offered in 1 1-2, 2, 3, 3 1-2, 5 and 6-ton load capacities, while the front wheel drives are in 3, 4, 5, 6 and 7 1-2-ton sizes.

Wichita

To its 1- and 2-ton trucks, the Wichita Falls Motor Co., Wichita Falls, Tex., has added a 3 1-2-ton model. This conforms to the general design of all of these cars which have their motor placed forward under a bonnet and drive back through a propeller shaft to a jackshaft and thence by chains to the rear wheels. Each of these cars is fitted with a different engine. The 1-ton has a 3.25 by 5; the 2-ton a 3.5 by 5 and the 3 1-2-ton a 4.25 by 6.75. It will be noted that the new vehicle has a specially long-stroke motor. On the 2-ton, a frame with 5-in. pressed steel channels has replaced one with 4-inch channels, while the new 3 1-2-ton has left drive. The others have right steering, although all include center control. Wheelbases are 110, 118 and 162 inches respectively.

Wilcox

One, 2- and 3-ton trucks are built by H. E. Wilcox Motor Car Co., Minneapolis. The two larger models are of the type wherein the motor is alongside of the driver's seat, the drive being on the right. It drives by shaft back to the jackshaft where the gearset is also located. Then chains take the power to the wheels. To be in line with the engine, the propeller shaft and differential are somewhat offset from the center. The 1-ton job has its engine in a forward bonnet, though retaining the jackshaft construction. Motors are 4 1-8 by 5 1-4; 4 1-4 by 4 1-2 and 4 1-4 by 5, respectively, and corresponding wheelbases are 124, 118 and 128. The body equipment is special.

Willet

The Willet Engine & Truck Co., Buffalo, is in the field with its same two trucks as last year. They are a 1,500-pound and a 2-ton type. These are changed in that they now are fitted with Continental engines instead of those of the Willet make. The sixes are 3 3-4 by 5 1-4 for the 1,500-pound car and 4 1-2 by 5 1-2 for the 2-ton vehicle. The lighter model has a drive-shaft to the rear axle while the 2-ton is of the jackshaft type. The wheelbase of the former is 125 inches, while that of the latter is 144 standard and 168 special.

Willys-Utility

The Willys-Utility, which is being made by Willys-Overland Co., at Lima, O., is a newcomer in the truck field within the last year although a model was exhibited at last year's truck show. It is a light delivery of 1,500 pounds capacity. The car has a 30-horsepower engine, 4 1-8 by 4 1-2 inches, and is in a forward bonnet. Its power goes to a jackshaft and thence to the wheels by chains. The wheelbase is 120 inches, and this gives room for a standard express body loading space of 84 by 48 inches. Pneumatics, size 34 by 4 are fitted to the front wheels, while 36 by 3 1-2 solids are used on the rear.

Witt-Will

Witt-Will Co., Washington, have 1, 2 and 4-ton trucks on the market. Changes for the current year are refinements only. These trucks conform to the same general design with the engines under the driver's seats and using side chains from jackshafts. The engines are all standard Continentals, the 1-ton having a 3 3-4 by 5 1-4, the 2-ton a 4 1-8 by 5 1-4 and the 4-ton a 4 1-2 by 5 1-2.

White Star

The White Star is a Brooklyn, N. Y., machine, made by the White Star Motor Truck Co. The 2, 3 and 5-ton models are continued without much change, while the 1-ton, which was formerly a stock model, is now only made on special order. These have right drive and control.

White

White trucks are four in number and the line comprises no new models for the 1914 year. Their ratings are 1,500 pounds, 3,000 pounds, 3 tons and 5 tons. While the 5-ton was the only model previously fitted with left drive, all cars for the current year are now steered from the left. In all models the motor is placed under the bonnet. The smaller two, which as well as the 3-ton have a 3.75 by 5.125 engine, are driven by direct shaft and bevel gears, while the 3 and 5-ton types have jackshafts and side chains. The 5-ton is equipped with a 4.25 by 5.75 motor. Pneumatic tires are a part of the equipment of the 1,500 and 3,000-pound jobs also. The wheelbases are 133 1-2, 145 1-2, 163 and 165 inches, respectively.

Electric Maintenance High

Acetylene Manufacturer Gives Figures on Cost Per Year of Keeping an Electric Lighting System

Says Upkeep, Bulb Replacements and Repairs May Reach $33.50 Per Year

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—I am more than willing to comply with the request of F. S. Wiemeyer, of the Buick Motor Co., St. Louis, in THE AUTOMOBILE for December 25, to give actual figures on the cost of lighting, but a comparative cost per hour between electricity and acetylene is impossible. Mr. Wiemeyer overlooks the fact that the user of acetylene pays only for the gas he uses and the less he uses the less he pays. The user of electricity, however, pays for his light whether he uses it or not and may pay an even larger bill if he does not use the light at all. Mr. Wiemeyer overlooks the fact that the user is generating electricity by day as well as by night, and that his expense is in no way determined by the number of hours he uses his light.

Neglect Bulb Replacements

When Mr. Wiemeyer assumes an extra gasoline cost of $1.34 for every 1,200 miles of travel and gives the impression that this is the only cost of electric lighting and starting, his charge that I am "trying to mislead the prospective buyer of a medium-priced car" is rather interesting. Henry B. Joy of the Packard company recently issued statements figuring lighting cost in the same way—that is, he assumed that practically the only cost was the extra gasoline consumed.

Neither of them allows even so much as 1 cent for lamp bulb replacements, battery renewals, electrical repairs, additional fuel and tire expense due to increased weight, etc. Mr. Joy may be perfectly justified in ignoring these items in the case of the Packard, not only because the proportion of weight added is far less, but also because the whole matter of expense is perhaps of scant importance to buyers of high-priced cars. But why Mr. Wiemeyer should assume that the same thing applies in the case of the man whose purse dictates the purchase of a car at $1,200 or less, needs some explaining.

I think the foregoing will explain why the figures given below do not apply accurately to high-priced cars, but are based entirely upon what the addition of electrical equipment has meant in a car of medium price and moderate power:

10 per cent. to 12 per cent. more fuel to operate the electric dynamo.
About 10 per cent. to 15 per cent. more tire expense.
5 per cent. to 10 per cent. more fuel on account of increased weight.
At least $12.50 per year for battery maintenance (based on 2 years' battery life).
$3 to $6 per year for lamp bulbs.
$5 to $15 per year for electrical repairs (based on 2 years' use).

Mr. Wiemeyer, or any other car owner, can easily foot that up to fit his own case, and he can then apportion it, if he desires, to get his cost "per hour".

Battery life, in the above estimate, is based on the average life of the battery used for lighting alone.

I state above that the repair expense is based on two years' use. This is for the reason that the owner who escapes this expense during the first year, but pays it during the second year, should strike a yearly average.

Acetylene Expense Easily Figured

The expense of acetylene lighting is much more easily calculated. Taking the average case, in which a cylinder containing 40 cubic feet of acetylene serves two headlights, each consuming 1-2 foot per hour or a total of 1 foot per hour, and taking $2.00 as the average price of an exchange on this size of cylinder the country over, the user may easily calculate his expense at 5 cents per cubic foot of acetylene. The expense per hour depends upon how much the driver uses the light turned on full, how much of the time he turns the light low, and how much he turns the light out altogether when making stops at night. Any user of acetylene, however, can easily figure his annual expense by multiplying the exchange price in his town by the number of exchanges he uses per year. Some drivers use two exchanges per year, or even less; some use eight per year, or even more. Our books show that the average user of acetylene buys between four and five exchanges per year, so that the average annual gas bill is between $8 and $10 per year.

The above is for headlights only. If the driver also uses a small acetylene burner in the tail light, consuming 1-8 foot per hour, his gas consumption will increase about 12 per cent. The use of two 1-8 foot burners in side lamps, or a total addition of 1-4 foot per hour, may or may not increase his gas bill at all, depending upon whether the driver has been in the habit of leaving the head lamps burning but turned down.

The expense of the average user for new burners, etc., will not exceed $1 per year. But, let me admit that it should run higher than that, because there are entirely too many users of acetylene who are wasting their gas through leaks in the brass pipe lines. Leakage of this sort is easily located by any user, and the leaks are easily repaired by soldering. A careful testing of the pipe lines once a year would more than pay for itself in gas saved. For this added attention, which the average gas pipe line does not get, Mr. Wiemeyer may add what he likes—my idea of the right addition would be about $1 per year on the average.

I am assuming that Mr. Wiemeyer is already familiar with my figures on battery life, repairs, etc., which have appeared in THE AUTOMOBILE during the past 6 months. He may, however, wish to question my figures in the above statement, regarding increased car weight, and increased operating expense due to increased weight.

I do not imagine that Mr. Wiemeyer, or anyone else in the automobile trade, will question the statement that automobile weight has been going up since the advent of electrical equipment. The only question is, How much does the weight increase?

Cars Show Weight Increase

Take the three leading medium-priced cars, as an example, two of which have been redesigned in the 1914 models to carry electrical equipment. These two manufacturers are both vigorously advertising their increased engine size, increased tire size, etc., and both these cars show more than the 10 per cent. increase in weight which I have provided for above. The third of the trio above referred to, has increased its weight about 5 per cent., but has not increased its engine, which in addition to this extra weight is operating an electric generator consuming 10 per cent. of its power.

It is universally admitted by the battery manufacturers that the batteries now in use on automobiles are entirely too small in proportion to the load placed upon them. To any trained battery man, this tells its own story. Touching on this point, it might be well for you to read, not only the paper prepared and delivered at the recent S. A. E. meeting in New York by W. C. Conant, of the Gould Battery Company, but also his verbal remarks, which appear in the stenographic report of the discussion explaining why automobile factories are buying inadequate batteries.

Mr. Conant in his paper says:

"The foregoing must not be taken to mean that comparatively small batteries are just as satisfactory for this work as larger ones; indeed, quite the contrary is true. Capacity required for cranking the engine is sometimes very considerable—more so, of course, in cold weather when the battery gives its poorer output—and should be largely the determining factor for size."

He also added at the close of the paper:

"With new electric equipment being added each season, the purchasing department has too much to say about the size of the battery."—R. H. COMBS, Prest-O-Lite Co.

The Automobile

PUBLISHED WEEKLY

Vol. XXX Thursday, January 22, 1914 No. 4

THE CLASS JOURNAL COMPANY
H. M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
231-241 West 39th Street, New York City

BRANCH OFFICES
Chicago—910 South Michigan Avenue Detroit—505 Free Press Building
Boston—1035 Old South Building Cleveland—516-517 Swetland Building

EDITORIAL
David Beecroft, Directing Editor
Donald McLeod Lay J. Edward Schipper Sydney Oxberry
L. V. Spencer, Special Representative, Detroit

ADVERTISING
F. B. Barnett, Cleveland C. H. Gurnett, Chicago
L. G. Vogel, Detroit F. J. Robinson, Chicago

Cable Address ---------- Autoland, New York
Long Distance Telephone ---------- 2046 Bryant, New York

SUBSCRIPTION RATES
United States and Mexico ---------- One Year, $3.00
Other Countries in Postal Union, including Canada ---------- One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Merchandizing that Sells

MERCHANDIZING that sells trucks and delivery wagons is still the great need of the truck business. For 4 or 5 years engineering salesmanship has been talked, and sales managers have loaded the mails with publicity on it, but still these same salesmen have failed to get engineering salesmanship worked out in their own business. They have not practiced what they preached. The salesmen are still too much the passenger-car salesman type, that class of humanity that delights to spend all day in the salesroom, instead of getting out into the quarry and digging up results.

Some truck concerns have only during the past season discovered the necessity of installing some form of efficiency bureau in connection with sales, in order to get even medium results, and after trial with imperfect organizations, these concerns announce that there are thousands of business houses that want trucks, but the trouble is to sell them. In a word, these concerns acknowledge that the field is there but the conquering force a little weak.

Those who have looked deeply into the truck merchandizing field are convinced that it is education that is needed, education of the buying concerns as well as education of the companies that have already purchased trucks and have had them operating for several seasons. It is the improper operation of trucks today that is working most against their more rapid introduction. Many concerns with large fleets have poor systems of operation. Perhaps the trucks are not kept moving enough hours of the day, perhaps the garaging system is such that they are costly; with others perhaps it is the driver, or failure to re-route the trucks in order to get their maximum work, and with others there are divers reasons why the looked-for efficiency is not at hand.

One thing is certain, namely, the people want trucks, but are delaying purchasing them. The remedy lies with the truck maker and the truck seller.

Factors in Truckdom

WITH a conservatively estimated output of 40,000 motor trucks and delivery wagons during the past season, with upwards of three score names of manufacturing companies removed from the motor truck roster and with thirty new names added, the motor truck business at the beginning of 1914 presents a stronger and more consolidated front than it has any time since its inception.

The last year has been a testing one in the industry, not that the mechanics of trucks have been any more in the public or business eye than heretofore, but rather that the business world has been passing through a period of waiting and expectancy which has stalled the buying of trucks by many concerns. The national sentiment of the past year has been a big factor in motor truck buying, hundreds and thousands of industrial concerns preferring to hold onto their money and horse equipment in a period of uncertainty rather than to expand and equip with motor apparatus.

The truck industry has not in any wise been responsible for this. It has been a national sentiment existing from ocean to ocean and from the lakes to the gulf. With the tariff a settled factor, with the currency bill on the books, and with the eventual course on trusts and so-called monopolistic organizations practically settled it is to be expected that business will soon return to its natural channels and the business in motor trucks show an anticipated increase.

Although there are approximately 274 concerns, of one stature or another, building motor trucks in America today, 90 per cent. of the output is produced by sixty concerns, the other 200 companies being of quite local nature, and often supplying vehicles only to the city or town in which they are located. Taking, then, these sixty so-called national concerns as a criterion, and basing conclusions on which they have accomplished during the past year, it is possible to blaze a few direction marks along the line on which the industry is moving.

The industry is gradually getting down to a more closely defined stratum of operation; that is, the individual makers are carving out their own niches with greater certainty. Where a year ago a concern was endeavoring to supply anything and everything in the truck field, now it has selected a certain division of the truck field and is concentrating more assiduously on it. One concern selects the field of load capacity between 1500 pounds and 3000 pounds, and although a year ago it had one model of 1-ton capacity for this entire field, it now has three models, one of 1500 pounds, one of 2000 pounds and a third of 3000 pounds. This is intensified manufacturing, and a concern with three models in this field should be in a commanding position to meet the trucking requirements of the most critical purchaser.

Concerns in this class of intensified merchandizing are discovering that it costs but little more to market three models than one, and with a certain flexibility in truck manufacture that seems imperative, the cost of production of three models as compared with one, is not prohibitive to the general scheme.

This program of intensified merchandizing has extended somewhat further during the past year, and is exhibiting itself with concerns that heretofore sold but one truck model of 3- or 5-ton capacity, but have recently added another model, which supplements the original one and greatly widens the scope of sales. There are many concerns that during the past 12 months have added one or two, and in some cases, three new models in order to more satisfactorily cover a field of load capacity. Concerns that a year ago listed 2-, 3- and 5-ton vehicles have found it necessary to add 4- and 6-ton sizes, so that now their program of models is complete.

This more certain definition of the selling field is one of the big steps of the year, which today looks like real progress, but which may be partly undone tomorrow if merchandizing conditions prove otherwise. The concerns following out this policy are but moving in the wake of other companies that selected this policy 1, and in some cases, 2 years ago, and are today pursuing it with the greatest success. Some companies had a clearly outlined policy of four or five models 2 years ago and are still continuing without change.

The Gasoline Motor Truck for 1914

(*Continued from page 227.*)

that of ignition. In this branch, noticeable gains are in evidence in the single wiring systems and those using automatic spark advance. The greater perfection of magnetos has made possible the use of this simple wiring method, making starting on them very practicable and eliminating batteries which are troublesome. The experience of the past year has proven conclusively that the magneto of today makes a battery unnecessary except on the very largest power plants. Accordingly dual ignition has slumped from 50 to 46 per cent. while single has gained, its old proportion being 33 1-3 per cent. and that of 1914 being 36 per cent.

Along with automatic advance fixed spark has been favored in many installations for the reason that while for engines where a wide speed range is used it is not advisable, the motor truck speed range is limited and non-variable spark does not become such a factor.

Automatic advance gets away from any objections which might be made to this fixed type, employing some sort of a centrifugal governing mechanism connected with the breaker mechanism or the armature of the magneto and making the spark advance in proportion to the increase in the engine speed. In this way, the operation of the truck in the hands of an unskilled driver is much less of a factor, particularly when he is limited to speed by the governor also. He only has to handle the throttle lever, and even that admits of little play.

Tobogganing the Chain

Final drive by side chains has decreased somewhat during the past year. To be exact, it has diminished from 79 per cent. to 68 per cent. as compared with last year. This difference has been to the advantage of bevel drives, which have increased from 11 to 12 per cent., in that the double-reduction designs which have now a percentage of 9 as compared with 5 last year and largely to that of the worm drives which have added to their numbers until now the proportion is 9 per cent. of all makes as compared with the rather low amount of 1.5 per cent. for the year past.

One of the factors directly responsible for the increase of worm drive aside from the increasing knowledge which worm gear makers have of the problem of worm and gear transmission of power is that it offers an inclosed means of drive, and gets away from the power loss due to exposed transmission parts which take up sand, gravel and other foreign matter. Where the chains are enclosed, however, this has ceased to be such a disadvantage. Then, too, worm gearing gives such a greater efficiency than other types that it cannot be overlooked.

Double-reduction axles, while affording an enclosed drive, get away from the large gearing that is necessary to take care of speed reduction between motor and rear wheels. Speed of trucks has remained about the same. Makers as a whole are convinced that they have arrived at about the correct amounts for each size of vehicle. The manufacturers quite generally adhere to the speeds which have been set down by the Standards Committee of the Society of Automobile Engineers.

Rational Load Guarantees

A commendable development of the year has been in the quite general elimination of the overload guarantees which burdened all makers in the past, much to the detriment of the trucks, the tire equipment and the pocket book of both maker and user. There has been a reversion to the policy of stating frankly what the truck has been designed to carry and to make the guarantee accordingly. The rating of a truck at a certain amount and then saying that it was capable of a given per cent. overload was always a loophole for the user, and the maker for his own self-protection is wise who states precisely what load his vehicle can take. It is true that some makers are rating somewhat higher than heretofore, but there is no overload possiblity tacked on. This on the face of it looks like an increase, but it is in the catalog only, for in reality, the increase takes care of the overload guarantee of the past.

Motor self-starters have not gained greatly over a year ago, although there are several makes of trucks equipped with them. For light delivery work where there are many stops, it is unquestionably a saving to allow the motor to stop, but for heavy work where a truck must make long hauls to be successful, its advantage from the standpoint of economy is questioned. Then, too, it is always the desire to reduce complication to the minimum, and the starter is an enemy to this.

The starter, to be successful on a commercial car, must be of much sturdier construction than is necessary for the passenger vehicle, for the reason that the truck springs are less resilient, it has to travel over rougher roads, and its frame is subject to greater jarring and vibration. This is hard on the battery, and together with the greater wear and tear on it from this cause, the battery does not receive the attention from the truck drive that it receives at the hands of the passenger car owner.

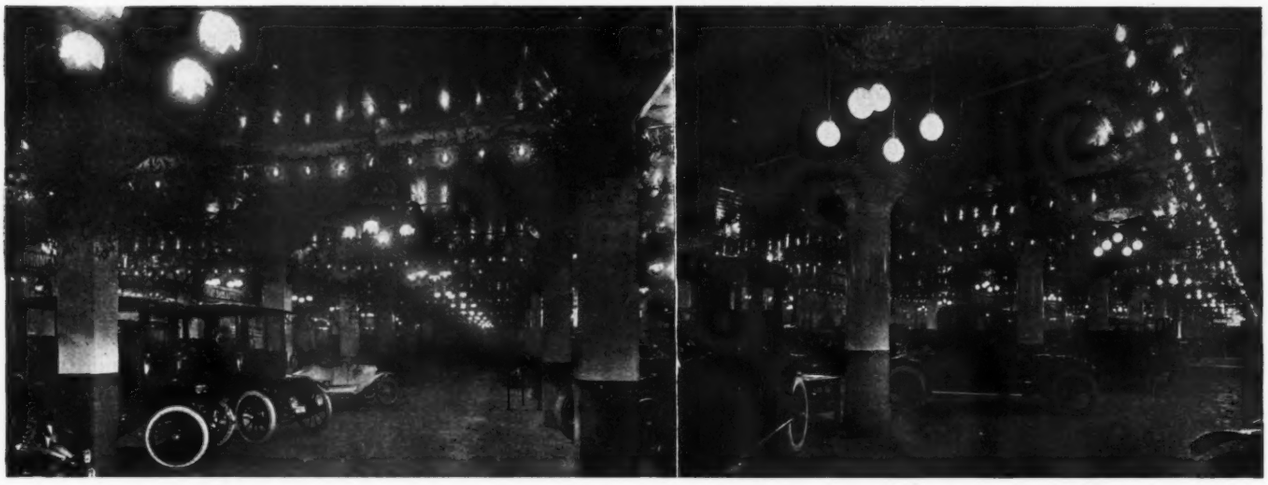
Electric lighting for trucks has also not shown any great gain over a year ago, largely due to battery difficulties also.

—

NEW YORK CITY, Jan. 19—The C. T. Silver Motor Co. has practically finished moving into its new home in the Peerless Bldg. A notable move was made by Mr. Silver in strengthening his organization when C. W. Oathout became his sales manager. He assumed his new duties on last Wednesday, after a 2-years absence from the automobile field.

—

DETROIT, MICH., Jan. 19—The meeting in Detroit of representatives of the various cyclecar clubs throughout the country has been postponed from Friday, January 23, to some date during the Chicago show, and will be held in Chicago.



Two views of the Detroit show which opened in the Ford building Saturday night. Left, third floor looking west. Right, second floor looking east

Detroit Show Opens with 82 Exhibitors

Show Held in Ford Assembly Plant—37 Makes of Pleasure Cars, 6 Electrics, 14 Commercial Vehicles and 6 Cyclecars—New Front Drive Truck Shown

DETROIT, MICH., Jan. 19—For the thirteenth year, the people of the automobile city are given an opportunity to view the new motor vehicles made in their midst as well as many which are not Detroit products. The Detroit Automobile Dealers' Association opened its exhibition on Saturday in the new Ford branch building, with thirty-seven makes of gasoline motor cars on display, six electrics, fourteen commercial vehicles, six cyclecars, and nineteen accessory makers. Of the predominating type of cars—the gasoline passenger class—nineteen are Detroit machines, while ten more are made in the state and the remaining eight are produced elsewhere. All but five of the trucks are Detroiters, while the entire half dozen cyclecars, around which particular interest centers, are made in the city.

Although the floor space of the present show is 30 per cent. in excess of the amount which was ever available at the old show place, the Wayne Gardens, it is said to be inadequate for the demand, several of the cyclecar makers being obliged to stay on the outside because they could not find space. The Wayne Gardens this year was unavailable for the exhibition, and the Detroit Dealers' Association was at a loss to know where to stage its annual affair until it hit upon the scheme of utilizing some of the space in the new mammoth Michigan assembling plant of the Ford company, located advantageously on the Detroit Boulevard at the corner of Woodward avenue. Accordingly, the Ford concern was approached and came to the rescue, offering three floors of the new part of the plant for the display.

Temporary Stairways Erected

But this left much to be done. That portion of the building which was to be used had little of the look of a show place when turned over to the Association. It was a shell and a good one, but there was no means of getting the machines onto the upper floors. Nor were there any elevators or stairways for the visitors. All of these things had to be built in temporarily, to say nothing of mural decorations, trimmings and a hundred and one other things which were all in readiness on opening night. Much credit is due the Detroit Dealers' Association for the way in which they have approached almost insurmountable difficulties and have put before the people of Detroit a local exhibition of which the Automobile City may well be proud.

But as the show goes on on the first three floors of the new part of the mammoth building, masons and workmen of all kinds are busily engaged in construction work on the remaining eight floors.

Among the passenger cars, no new models other than those which have been announced to the public within the past few months are to be seen, although there are five cars which were not exhibited at the Grand Central Palace in New York. These are the Ford, Paterson, Grant, Chevrolet and Monarch. The latter is a new Detroit car which is having its first show experience, although it was described some time ago. It is made by the Monarch company, of which R. C. Hupp is the moving spirit. It has the French type of sloping hood with radiator behind.

Listed among the passenger cars are three light cars, also comparatively new to the general public. These are the Grant, the Saxon and the Car-Nation, all of which sell at low figures. Detroiters seem very much interested in the cyclecars, judging from the crowds around them. On show are the LaVigne, Rocket, Mercury, Cricket, Hawk and Detroit.

The Detroit display has the distinction of housing a parcel car, the newest type of delivery vehicle. This car is mounted on a Rocket cyclecar chassis and is a small closed delivery vehicle with the drive seat in front. Such a vehicle should have a great field among merchants who need a means of quick delivery of light articles of small bulk. This small vehicle has heavier rear springs than the regulation Rocket, tandem passenger type and is designed to carry 350 pounds of merchandise. It has a capacity of 38 cubic feet, and with standard equipment sells for $395.

New Front Drive Truck

Although most of the fourteen commercial cars on display are conventionally designed along the lines dictated by present day truck engineering practice, the Detroit show has brought to light a new design of commercial car which is a front-wheel drive type. It is the Pull-More, product of the Pull-More Motor Truck Co., Detroit. The newcomer has been in the process of development for over a year and its designers have waited for this exhibition to "spring it." By placing the drive in front, the Pull-More is made a two-unit proposition, the front unit embodying the power plant and all driving mechanism being separate and independent of the carrying body. The latter unit is coupled to the power unit by a bridged iron reach, which operates on a hinged device located midway under the power unit.

Another unique feature is the ability to get at all of the working mechanism very easily. The power plant with transmission shaft and gearset in combination with it is mounted over the front wheels and encased in a two-piece casting. The motor, bearings, gearset and in fact all working parts are mounted in the upper section of this, while the lower portion incorporates all the steering apparatus and the lubricating system. In order to get at all of the parts at once, one set of clamps which hold the two halves of the assembly are removed, and by a ratchet and

screw device, the side from which the clamps have been taken is raised, the other side having hinges along the split of the halves to make this possible. Of course, before this can be done. the propeller shafts running at right angles to the main driving shaft from the motor and which drive from the differential out to the chain sprockets, must be slipped out. A clever device permits of their easy engagement for driving or disengagement for removal.

From the driving sprockets, the chains run to the front wheel sprockets in the usual way. Since there is no driving mechanism in the rear unit, it is possible to make it low to the ground, the height of the platform being 28 inches. The car uses a 3 3-4 by 5 1-2 motor, has a three speed gearset, cone clutch, is mounted on 34 by 4 solid tires and the wheelbase is 117 inches. The Pull-More capacities are 1 and 2 tons, prices being $1,800 and $2,000 respectively.

Ford Has Miniatures of All Models

Special interest attaches to the Ford exhibit, not so much on account of the presence of the well-known model T as on account of the case full of all of the previous models of motor vehicles which have borne the Ford name. These are all in miniature and show the development up to the present type.

Besides this, there is a bulletin board in the Ford space, which gives hourly records of the production of model T motor production. This bulletin board records the actual number of motors turned out during each day of the show. At 2.30 p. m., today, the data stood as follows:

Total Built to January 19, 422,302

TODAY'S ACTUAL HOURLY PRODUCTION.

A. M.	No. each hour	Totals
8:00	...	...
9:00	125	...
10:00	130	255
11:00	152	407
12:00	148	555
12:00 to 12:30 (Lunch)		
P. M		
1:30	154	709
2:30	144	853

On Saturday, the bulletin board showed a total of 1,125 engines made up to 4.30, or the end of the 8-hour shift to which the data refers.

Although it is still early in the week to make any definite statements as to the value of this year's show from the sales standpoint, it may safely be said that the exhibitors are an optimistic lot for the coming year. In fact, almost to a man they predict a banner year and are making preparations for it. With the show but 2 days old, nearly every exhibitor has one or more sales already chalked up to the credit of the exhibition. One electric car maker has already closed up for three vehicles.

Although it is primarily a dealers' exhibition, a Detroit show must of necessity include many exhibits of direct factory branches. Eleven of the thirty-seven makes of passenger cars are shown by the direct factory branches, all but two of the electrics are so exhibited, six of the commercials and all of the cyclecars are Detroit made.

—

DETROIT, MICH., Jan. 19—Among the important meetings being held in Detroit during the show week is a convention at the Lozier plant of 50 mechanics and repair men from the service departments of Lozier dealers throughout the country. The work will be in charge of H. W. Miller and F. E. Fox of the factory service department and will include instruction in the adjustment of the carbureter and electrical equipment given by experts from the factories that made these units. A dinner given by the company and an inspection of the Detroit show will be included in the program.

—

Specifications of Trucks Received Too Late To Classify

Below are given the specifications of several trucks that were received too late for classification either in the truck descriptions that occupy pages 234 to 249, inclusive, or for insertion in the specification sheets, pages 250 to 259:

General Vehicle Co.'s FV Model

The General Vehicle Co., Long Island City, N. Y., is making a 6-ton gasoline truck for 1914 which is known as the FV. It has a four-cylinder 4.25 by 5-inch motor located forward, a cone clutch, a four-speed gearbox amidships and an internal gear drive. Elliptic springs and solid tires are used and the wheelbase is 169.25 inches.

Sandow 1.5 and 2-Ton Models

The trucks made by the Sandow Truck Co., Chicago, Ill., are built in 1.5 and 2-ton sizes. Both models employ 3.75 by 5.25, L-head block motors from which the drive is taken by a multiple-disk clutch to a three speed gearset that is a unit with the motor. Right drive and center control are used. The springs are half-elliptic and the rear drive is by chain.

Royal 3 and 5-Ton Capacities

Royal trucks are offered in 3.5 and 5-ton capacities. Both models are equipped with four-cylinder motors, 4.375 by 5.5 inches, the cylinders being cast in pairs. A disk clutch, three speed gearset amidships and side chains are used to carry the power to the wheels. The wheelbases are 132 and 138 inches and solid tires are used.

Stewart 1-Ton Model

Besides the 1500-pound model listed, the Stewart Motor Corp., Buffalo, N. Y., are making a 1-ton type with a 96-inch wheelbase and 36 by 3 solid tires. T-head cylinders cast in pairs, and measuring 5 by 5, are used. A multiple-disk clutch and a three speed gearset amidships complete the power plant specifications.

Kelly Has 3 and 5-Ton Types

The Kelley-Springfield Motor Truck Co., Springfield, O., has two models in addition to the two described. These are 2 and 5-ton trucks, the smaller having a wheelbase of 144 inches and that of the larger being optional. Both have chain drive and left steering with center control. The motor on the K-35 has L-head Block cast cylinders 3.75 by 5.25 inches and the K-50 is equipped with T-head cylinders in pairs, the bore and stroke being 4.5 by 6.5. Cone clutches and three speed selective gearsets are found on both models.

—

Knight Interests To Meet on Wednesday

CHICAGO, ILL., Jan. 20—*Special Telegram*—The Knight interests will hold their meeting on Wednesday of show week and there will be present the engineers and producing experts from the Moline, Willys and Lyons companies and from the Stearns, Maxwell and Russell companies as well as Charles Y. Knight, L. B. Kilburne, E. C. Lonas and Owen Thomas. In all probability this meeting will be held at the Chicago Automobile Club.

The Overland dinner also is scheduled for Wednesday night, the booking being at the La Salle.

—

Empire Now Uses Remy System

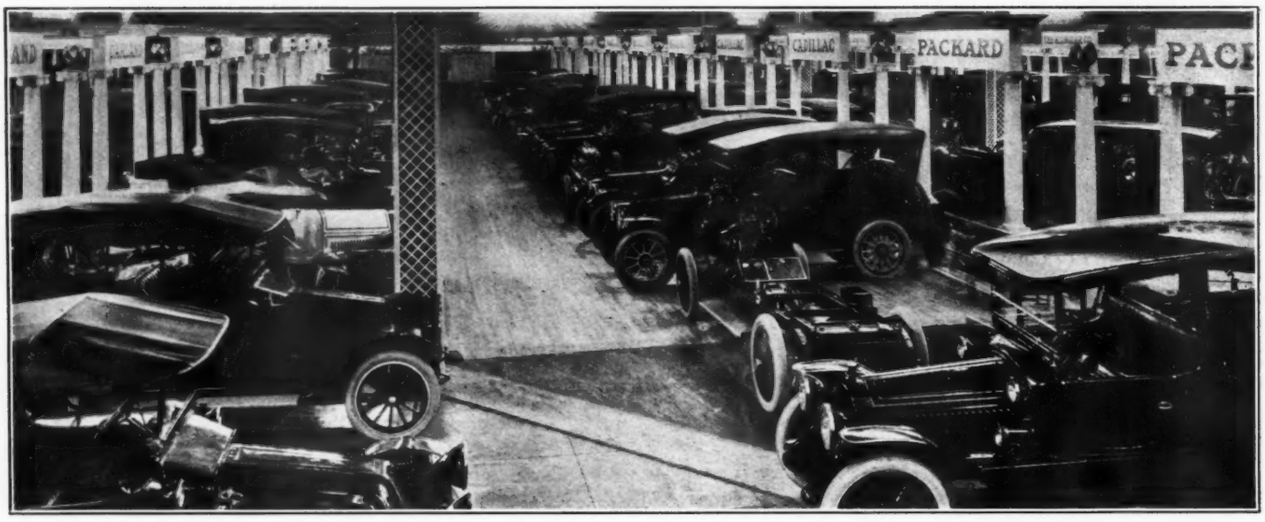
NEW YORK CITY, Jan. 20—The Empire car, Model 31, is now regularly furnished with Remy starting and lighting apparatus, viz., Model S. L., combined starting motor and lighting generator. This information was received during the show week, after THE AUTOMOBILE had published, on pages 40 and 47 of the January 1 issue, that the Empire was equipped with the Eisemann, which was then the standard equipment. The National six-cylinder is regularly furnished with a Remy type P magneto.

—

Studebaker Uses Floating Axle

NEW YORK CITY, Jan. 21—On page 83 of THE AUTOMOBILE for January 1, where it states that the Studebaker four is not fitted with a floating axle, a typographical error has been responsible for a mis-statement. The sentence should read: "The four is now fitted with a floating axle."

Ford building, in which the Detroit show is being held



View of Pittsburgh's show, illustrating the decorative scheme and showing how carefully the space was allotted in order to provide room for all the cars

Chicago To Have 276 Exhibitors

Pittsburgh Has Large Attendance—Washington Show Opened—$1,000,000 Worth of Cars Sold at Cleveland

CHICAGO, ILL., Jan. 19.—The fourteenth annual Chicago show, which opens Saturday afternoon, January 24, promises to live up to its reputation as being the greatest business show of the country, for this great Middle West is a market that is the very backbone of the motor industry. More agents attend the Coliseum affair than go to New York, and present indications make it seem as if this year there would be more dealers than ever in attendance, which, of course, means business for the exhibitors.

Samuel A. Miles, show manager, has the two big buildings almost ready for the exhibitors. The decorations are nearly complete and it looks now as if this show would be the best-looking one Miles ever put on. In general the idea is that of a conservatory, a glass roof having been put on in the Coliseum, while poplar trees and palms add to the conservatory effect.

Eighty-seven Car Makers to Exhibit

The count today shows that there will be a total of 276 exhibitors, of which number 87 are car manufacturers. Numerically speaking, this is not as large as the New York show, which had 83 car makers and 266 exhibitors of accessories. But Miles could not squeeze any more into the three buildings, the Coliseum, Annex and Armory, although he has a long waiting list. As he has the plan laid out, cars will be shown exclusively on the main floors of the Coliseum, Annex and Armory, while the two galleries and the second floor of the Annex will be given over to the accessory folk.

Chicago will have more different makes of cars on display than New York, but there will not be so many as in previous years, the count being 87 for Chicago and 83 for New York. This is accounted for by the refusal of some of the makers to accept space in the basement of the Coliseum annex. This space, however, was eagerly grabbed by the accessory people.

Fifteen Makes Which Were Not at New York

There are 15 makes of cars showing at Chicago which were not at New York, while the latter had 11 makes which will not be in the Coliseum show. New York's extras, however, all were gasoline cars, while 6 of Chicago's 15 surplus are electrics. Those in Chicago and not in New York are: Argo electric, American Cyclecar Co.; Borland electric, Broc electric, Lambert, Chicago electric, Crow, Lexington-Howard, Marathon, Pilot, Westcott, Woods electric, Stickney cyclecar and McFarlan.

New York's 11 not showing at Chicago are: Briggs-Detroiter, Briscoe, Cameron, Cornelian cyclecar, Empire, Fischer, Kline, Mitchell-Lewis, Twombly, Vaughan and Ward.

The makes of cars booked for Chicago are: Abbott-Detroit, Allen, Detroit electric, Apperson, Argo electric, Auburn, American cyclecar, Baker electric, Borland electric, Lambert, Buick, Cadillac, Cartercar, Case, Chalmers, Chandler, Chicago electric, Cole, Crow, Davis, Fiat, Franklin, Garford, Great Western, Haynes, Henderson, Herreshoff, Howard, Hudson, Hupmobile, Imperial Jackson, Jeffery, Keeton, King, Kissel, Krit, Lexington, Locomobile, Lomax, Lozier, Lyons-Atlas, Marion, Marathon, Marmon, Maxwell, McFarlan, McIntyre, Mercer, Metz, Mitchell, Moline, Moon, National, Oakland, Ohio, Oldsmobile, Packard, Paige-Detroit, Partin-Palmer, Pathfinder, Peerless, Pierce-Arrow, Pilot, Pope-Hartford, Premier, Rauch and Lang electric, Regal, Reo, Speedwell, Standard electric, Stearns, Stevens-Duryea, Stickney cyclecar, Studebaker, Stutz, Velie, Vulcan, Waverley electric, Westcott, White, Willys-Knight, Winton, Woods electric.

In contrast to New York, there will not be so many meetings. The executive committee of the National Automobile Chamber of Commerce will hold its monthly meeting in the Armory on Wednesday, January 28, while the dinner of the Exide battery people will be held the same night at the Mid-Day Club. The Illinois Garage Owners' Association also will have a two-day session at the Lexington, January 27 and 28, winding up with a banquet. More than 100 dealers will attend.

Chicago to Have Cyclecars in Big Show

CHICAGO, ILL., Jan. 21—*Special Telegram*—Manager Miles and Clyde Warner, promoter of the Cyclecar show in the old Wilson building, now known as the Greer building, have got together with the result that the interests of the two have been merged so far as the Greer building is concerned. An entrance with the Coliseum annex will be opened and Miles will move some of the passenger car exhibits from the basement to the Greer building, putting some of the cyclecar concerns into the space.

Pittsburgh Show Has Attendance of 8,500 on Opening Night

PITTSBURGH, PA., Jan. 19—Right in the heart of motordom and central to at least 5,000 automobiles owned by East End residents, the eighth annual show of the Automobile Dealers' Association of Pittsburgh opened Saturday night, January 17, in the Motor Square Garden in the East End. The location could not be better. It is directly across Baum street from the clubhouse of the Pittsburgh Automobile Club, and within a square of the headquarters of the Dealers' Association. The big garden, which had been beautifully decorated, had 8,500 visitors.

A cyclecar was the center of attraction for hundreds of visitors and every make of America's leading motorcycles was shown. Rivaling all other exhibits and attention was the 8-cylinder De

Dion, the first car of its kind ever seen in Pittsburgh, and priced at $5,700. The biggest car in the building was a 6-60 Pierce which loomed up as a Goliath compared with a little cyclecar.

Of much interest to a large proportion of the visitors was the used car section in the basement, where 20 second-hand machines were on display in charge of W. H. Lafountaine, a veteran show manager of this city. The value of the line-up was estimated at $2,000,000.

The electric car came in for more attention than ever before for the reason that socially inclined women in Pittsburgh are enthusiastic over these vehicles this year. The all-steel body cars were also an attractive feature. On either side of the Garden were the accessory exhibits extending entirely around the building.

Contest Among Owners of Old Cars

Probably the most interesting feature of the show this week will be the contest among owners of old cars, which will be pulled off today. A prize for the oldest car in the State has been offered by the show management and 30 entrants have already been announced.

Thursday night will be "Society Night" and special music for this occasion will be furnished. Entertainment for the afternoon crowds has also been provided for several days. The show committee is composed of Ray McAllister, W. Murray Carr, W. N. Murray, L. C. Meyers and Earl Kaiser.

Pittsburgh now has 195 commercial garages, all well equipped for public service. Instead of one automobile agency, as there was in 1900, Pittsburgh now has forty-three automobile dealers each with an established agency. There are twenty-two legitimate dealers in motor trucks, and five agencies for electric vehicles, namely, the Detroit, Waverley, Baker, R. & L. and Ohio. In 1913 these five agencies sold fifty-six electric vehicles at an average price of about $2,800. In the city there are now forty-five recognized supply houses.

Owing to Pittsburgh's peculiar geographical location and the fact that it supplies 45.7 per cent of the raw material used in the manufacture of the American made motor car, special and successful efforts have been made the past 2 years to locate more automobile factories here. As a result of the efforts of the Pittsburgh Industrial Development Commission, the Duquesne Motor Car Co. is now manufacturing cars here, the Model Gas Engine Works moved their plant from Peru, Ind., to this city to make automobile engines, and the Pittsburgh branch of the Ford Motor Co. is now being built in this city. In addition to these plants, the Lange Motor Truck Co. has been for several years successfully manufacturing motor trucks here.

Gains Made by Low-Priced Cars

The sales made the past year indicate that in spite of hard times the automobile business has held its own better than almost any other line in this district. Most dealers reported last year's sales nearly or quite equal to those of 1912, and several concerns report a gain of from 10 per cent to 25 per cent. The gains were made chiefly in the sales of low priced machines, that is, cars selling from $600 to $1,500. Real high-class cars just about hold their own. In motor trucks there was a very large gain in sales, and especially in inquiries which are likely to develop into deals this spring.

—

Washington Dealers' Show Opened by President Wilson

WASHINGTON, D. C., Jan. 19—When the President of the United States tonight pressed a button at the White House turning on the electric lights at Convention Hall, and thus opened the annual motor car show, the largest number of people that ever attended an event of this kind here gave vociferous approval of the fine exhibition of cars and accessories prepared for their inspection by the Washington Automobile Dealers' Association.

The Automobile Trade Association did not exhibit, and while the show was incomplete in this particular every space was occupied and the show started out tonight as though much business would be done. Nine factories that are not represented in Washington sent exhibits to the show with the expectation of landing a dealer. The cars are Hupmobile, Briscoe, Davis, Kline, Mitchell, Ohio electric, Regal, Winton, and the Imp cyclecar. Thirteen other gasoline cars are exhibiting, as well as three other electrics and two trucks.

The accessory and allied exhibits number eleven. The cars not represented at the show, which are sold in Washington, are Chalmers, Reo, Studebaker, Overland, Ford, Oakland, Oldsmobile, Buick, Locomobile, Packard, Pierce-Arrow, Rauch & Lang, Cadillac, Baker electric, Franklin, Marion, Paige-Detroit, Maxwell, Jeffery.

Many of the dealers here control territory in portions of Virginia and Maryland, while a few have a slice of West Virginia. Cars selling for $2,000 and under have the call here. There are several high-priced makes that are in favor, but as Washington is not a manufacturing town and the field for the high-grade cars is rather restricted, it is really remarkable what the dealers in such cars have accomplished in the way of sales in the last few years.

Electrics Selling Well

One feature of the trade that is showing improvement all the time is the electric. No city in the country offers better opportunity for the sale of electrics, and Washington is forging to the front all the time as an electric town. The streets are wide and well paved, there are no hills of any consequence, and in a word the conditions for electric car users are ideal. Probably 800 of them are in use here at the present time, and it is likely the thousand mark will be neared before the end of the present year.

—

$1,000,000 Worth of Cars Sold at Cleveland Exhibition

CLEVELAND, O., Jan. 19—More than 500 automobiles with a value exceeding $1,000,000 were sold during the Cleveland Automobile Show at Wigmore Coliseum, according to estimates made by the managers. Exhibitors claim the total will exceed these figures by far. The computation is made on the basis of from twelve to fifteen sales each for the exhibitors, though many claim their sales will run into the hundreds, explaining that agents have been large purchasers, contracting from ten to fifty cars for delivery at a later date.

The show was the biggest of any in Cleveland previously and the total attendance for the week was near 150,000.

Charles Y. Knight, of Coventry, England, arrived here Thursday, and during his stay was the guest of Frank B. Stearns, of the F. B. Stearns Co.

—

Quaker Show Reveals Many Prospective Buyers

PHILADELPHIA, PA., Jan. 17—In point of attendance, and most of all in volume of new business developed and consummated, the thirteenth annual motor car show which closed tonight classes as the most successful ever held in this city. Visitors arrived early in the final evening and stayed late, seeming loathe to leave, and consequently the Metropolitan Building was crowded to the doors until the closing hour.

Members of the show committee of the Philadelphia Automobile Trade Association having the event in charge were a unit in declaring that the interest aroused forecasts a period of sales activity never before equaled. Just how much new business directly traceable to the show has been done cannot be determined as yet.

The ascendency in price of the little car is due to several things, which when taken into consideration make for greater value for the money expended than ever before. For instance: Self-starters and electrical equipment are included, likewise full equipment of windshields, top, speedometer, etc. This, of course, all means additional cost to the manufacturer. Another reason for increased price for the little car is in the fact that some makers of the low-priced 4-cylinder machine have added a 6-cylinder type.

The accessories dealers crowded out of the Metropolitan Building because of insufficiency of space conducted an independent show directly across Broad street, and it was so successful financially that the companies represented are considering the advisability of making it a permanent exhibit. Here also were shown the Borland electric car and the Imp cyclecar.

Several private exhibitions of commercial vehicles are on the tapis for next week. There was no truck annex to the auto show this year.

—

Show Space All Taken at Kansas City

KANSAS CITY, MO., Jan. 19—Spaces for 110 exhibits have been obtained for the annual show of the Kansas City Automobile Dealers' Association, which opens in Convention Hall, February 16. Sixty-three of these are pleasure and commercial cars. No more space remains to be sold, and, according to E. E. Peake, secretary of the association, the present outlook is for a show which will surpass that of last year when 50,000 persons attended.

—

INDIANAPOLIS, IND., Jan. 19—*Special Telegram*—The Empire Automobile Co. could not obtain adequate space at the Chicago show, and therefore will hold a special exhibition at the home of its Chicago distributor, the Ralph Temple Automobile Co., 1219 Michigan Ave., Chicago. The new stream-line roadster and the electrically started and lighted models of the Empire will be exhibited as well as the standard five-passenger.

Benz Makes 122 m.p.h. at Brooklands

Falcon Cyclecar Reaches Staunton, Va.—Militia To Guard Santa Monica Course—Indianapolis S. A. E. Discusses Ignition Tester

LONDON, ENG., Jan. 15—*Special cablegram*—Hornsted in the big Benz formerly driven by Hemery, has crowded 2 miles into the minute, the fourth time this feat has been performed in the annals of motoring and the first time it has been accomplished on a speedway. In a trial at Brooklands today Hornsted, with a flying start, covered 2 miles in :57.99, equal to 122.05 miles per hour. This performance beats the :58 2-5 for 2 miles, made by Demogeot in the eight-cylinder Darracq at Ormond beach, Florida, U. S. A., on January 29, 1906, when W. J. Morgan staged his sensational 2-miles-a-minute race in which Demogeot defeated Marriott in a Stanley steamer. Marriott also succeeded in getting inside the 1-minute mark, his 2 miles being turned in :59 3-5. Bob Burman still holds the record with 2 miles in :51.28 made in 1911 at Ormond beach.

Hornsted also succeeded in beating the 5-mile flying start speedway record with 2:35.08, equal to 116.07 miles per hour. While this is the best track mark, yet it does not quite touch the 5 miles in 2:34, made January 24, 1906, at Ormond by Hemery in the eight-cylinder Darracq. In his trials today Hornsted had his Benz shod with Rudge-Whitworth wire wheels. The Benz has a four-cylinder motor with an 185-millimeter bore and 200-millimeter stroke. On December 22 it smashed the standing start kilometer record with :30.405, the average for two trials made both ways of the track, and the 1-2-mile standing start, which he turned in :25.545.

Falcon Cyclecar Reaches Staunton, Va.

STAUNTON, VA., Jan. 16—Escorted by city officials and members of the Staunton Automobile Club the Falcon cyclecar driven over the mountains from Cleveland, Ohio, to the Virginia city, arrived at 7 o'clock on Friday, January 9, after the most gruelling trip ever undertaken in so small a vehicle.

The little car, which started from Cleveland on December 29, experienced the worst of the snow storms which swept the southern Ohio and Pittsburgh districts, and was snow-bound for three days near Columbiana, Ohio, reaching Pittsburgh after a hard struggle with deep snow. The drivers carried letters of greeting from Mayor Newton D. Baker of Cleveland, and from the Cleveland Automobile Club, to Mayor Hampton Wayt and the Council of Staunton.

Bryce E. Blackley, in charge of the tour, became sick at Pittsburgh from exposure, but pluckily took the car through to Meyersdale, Pa., where he finally collapsed. He was relieved by F. R. Hoyt, designer of the Falcon, who drove all night over the notoriously bad roads from Cumberland to Hagerstown, and the following day drove down the Valley National Pike to Staunton.

Within 25 miles of the destination, on a perfect road, the only serious mishap of the trip occurred. While traveling at high speed, the little car hit a sunken railroad crossing just outside Harrisonburg, Va., breaking a front spindle, the result of a blowhole in the metal. The car went into the ditch, but did not upset, and neither driver was injured. The broken part was repaired at Harrisonburg, and the cyclecar led its escort a runaway race over the hills into Staunton.

To Describe Tour in Electric Car

NEW YORK CITY, Jan. 18—The January meeting of the Electric Vehicle Assn. of America will be held on January 28, in the Engineering Societies Bldg., this city, on which occasion Colonel Bailey will give an interesting illustrated description of his trip by electric automobile from Boston to New York City and then to Chicago.

State Militia Will Guard Santa Monica Course

LOS ANGELES, CAL., Jan. 16—At a meeting held yesterday in the office of Mayor Dudley at Santa Monica, Cal. the question of guarding the course for the Vanderbilt and Grand Prize races of February 21 and 23 was discussed. The city of Santa Monica has taken over the work of guarding the 8.2 miles and the matter has been placed in charge of chief of police Randall. He has been empowered to secure as many men as possible to make the course safe and arrangements are now being made to secure the state militia.

More fences will be built than before and spectators will not be allowed within 200 yards of the Nevada avenue turn. The turn and the roadway for 200 yards on each side will be fenced off.

The curves will not be banked, but much additional work will be done to make the turns even safer than before and all this will tend toward a faster course. The entire 8 miles will be resurfaced and this work will start immediately. A grandstand will be erected to accommodate 20,000 people.

Indianapolis S. A. E. Discusses Ignition Tester

INDIANAPOLIS, IND., Jan. 20—*Special Telegram*—The announcement and demonstration of an instrument which records graphically the current and power consumed in every phase of lighting, ignition and starting of engines was a feature of the January meeting of the Indiana section of the S. A. E. this evening, held in demonstration room of the Esterline company. George Weidley was chairman. Papers read were: Curve Drawing Instruments and Their Application, by C. E. Hansell, assistant manager, the Esterline company, and Tests of Electrical Automobile Apparatus, by M. Esterline. His paper bore on the use of instruments to test electric equipment and the use of the starting motor in testing the gasoline engine. The talk was illustrated by actual tests performed on an engine. The engineers evinced much interest in the new Esterline instrument. The most interest was created by the difference in starting current required in the different cylinders of the same engine by variations in compression. The advantages of such a test as a final test of a car before delivery was acknowledged by the engineers.

S. A. E. Will Discuss Gyroscopic Action

NEW YORK CITY, Jan. 21—At a meeting of the Metropolitan Section of the Society of Automobile Engineers to be held at the Automobile Club of America tomorrow night, E. P. Hopkins will read a paper explaining the application of gyroscopic influence to his monorail system. Edward Durant will also read a paper introducing a general discussion on gyroscopes.

The Automobile Club of America's meeting rooms have been selected owing to the fact that a large attendance is expected because members of the Motor Truck Club and other organizations will be invited.

Connecticut Still Represented in A. A. A.

NEW YORK CITY, Jan. 21—"Connecticut will continue to be excellently represented in the A. A. A., and it will be made up in part of the members of the present State Association," said President J. A. Wilson. "The machinery of the present state body has fallen into the hands of its secretary, who in the recent election accumulated three positions, the secretaryship and the chairmanship of two important committees, all of which add to the income which he obtains for his services."

Last week, at the annual meeting of the Connecticut Automobile Assn., held in New Haven, it was voted to withdraw from membership in the A. A. A. It was claimed that Connecticut had not had the proper representation and that the dues were

Falcon cyclecar in Staunton, Va., after completing rough overland trip from Cleveland

out of proportion to the benefits derived. One of the officials states that the same organization will be kept, but that the federation of clubs will be along purely amateur lines. The money formerly paid by the state association to the A. A. A. will be used for signs. The following officers were elected at the annual meeting of the association: J. M. Emerson, president; C. M. Robinson, secretary and F. C. Howe, treasurer. Mr. Robinson was named as chairman of the legal and membership committees. Arthur Fifoot, secretary of the Automobile Club of Hartford, was appointed chairman of the good roads committee. The state association as it now exists has a membership of about 4,000. The new association will become a reality within the next 6 or 8 months.

—

NEW YORK CITY, Jan. 17—Richard Kennerdell, chairman of the contest board of the A. A. A., has invited all of the 1913 members of that board to continue in office.

—

CINCINNATI, O., Jan. 17—The Cincinnati Automobile Club has withdrawn from affiliation with the A. A. A. and also the Ohio State Automobile Assn., because of the Dr. A. B. Heyl incident. This action was taken at a meeting held January 14. Dr. A. B. Heyl, an active member of the Cincinnati club, was censured for an attack published in a Cincinnati newspaper on the policy of the officers of the A. A. A. The reason for withdrawing from the Ohio State Automobile Association, is said to be that its president C. C. Janes, refused to defend Dr. Heyl before the Richmond meeting.

—

Morrell Heads A. A. A. Metropolitan Consulate

NEW YORK CITY, Jan. 17—President J. A. Wilson, of the A. A. A., has appointed Robert Lee Morrell, president of the A. A. A. Metropolitan consulate, which has a membership of over 2,000, and conducts its affairs from the A. A. A. national headquarters at 437 Fifth avenue. Mr. Morrell has had long experience in automobile affairs, having once been chairman of the A. A. A. racing board, and having occupied a similar position in the A. C. A., of which he was a vice-president. He will superintend all legislative matters that may come up in this section.

—

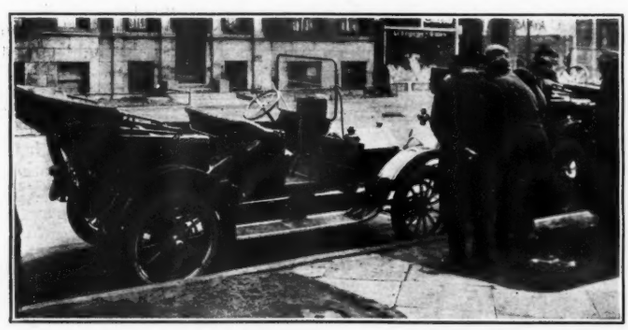
Truck Club Discusses Tires

NEW YORK CITY, Jan. 21—The regular monthly meeting of the Motor Truck Club was held this evening at the new building of the Locomobile Co. of America, Sixty-first street, this company having set aside an entire floor for the entertainment of the club and its guests. The subject of the evening was "The Relation of Motor Tires to the Cost of Maintaining Motor Trucks," and the speaker of the evening was S. V. Norton, truck tire sales manager of the B. F. Goodrich Co., Akron, O. His address covered the entire construction of a tire from the trees of the tropical jungle to the completed tire on the truck and even went further, treating many of the problems of use and abuse of truck tires, and all were illustrated with stereopticon. Invitations to several hundred truck owners were sent out before the meeting, owing to the importance of truck tire economy.

—

New York Now in U. S. Chamber of Commerce

WASHINGTON, D. C., Jan. 14—New York has become represented in the Chamber of Commerce of the United States of America during the past 3 months by the election of commercial organizations operating in twenty cities. The total number of organizations in the Chamber from New York is eighty.



One of the Buick fours that participated in the recent economy test held in Chicago. Notice the special gasoline tank installed on the dash for measuring the fuel

Buick Six Does 20.1 Miles to Gallon

—

Large and Small Four-Cylinder Buick Models Also Show Economy Running 22.5 and 17.9 Miles Per Gallon — Weather Conditions Unfavorable

—

CHICAGO, ILL., Jan. 15—In a semi-official fuel economy test of three Buick cars, the six-cylinder car ran 20.1 miles on one gallon of gasoline. The cars tested were a Buick model B-25, which showed a consumption of 22.5 miles per gallon; a model B-37 which showed 17.9 miles, and the six-cylinder car.

This test was conducted yesterday under the direction of F. E. Edwards, formerly chairman of the technical committee of the American Automobile Association. To the six-cylinder car and the small four, the model B-25, special fuel tanks were fitted on the dash, but the model B-37 had no special tank, using the fuel from its regular pressure tank.

Weather conditions were unfavorable for a test of this kind on account of the cold, a high wind, and a snow storm. The temperature was 45 degrees F. at the beginning of the test and 41 degrees at its conclusion. The distance was measured with a speedometer on each car. These speedometers were tested by Stewart-Warner Corp. for odometer accuracy before the run was started, the gearing at the wheels and to the speedometer instruments also was checked. On the model B-55, which was equipped with a Warner speedometer, another test of the gearing and odometer mechanism was made after the run.

The gasoline used was measured in an official standard gallon measure. The fuel used was commercial gasoline which showed a hydrometer reading at the beginning of the test of 62 degrees Baumé at a temperature of 60 degrees F. At the conclusion of the test the gasoline was again tested and showed a hydrometer reading of 60 degrees Baumé at 41 degrees F.

Two four-cylinder cars made the test with the windshield up, the six had the upper one-third of the windshield horizontal after the first two miles. In all the cars the top was down. With the exception of 4 miles going from 33d street to Jackson Park the test was made on a circular course of approximately 2.3 miles around Jackson Park. The direction of the circuit was changed occasionally, sometimes the cars going clockwise around the circuit and sometimes anti-clockwise. There was a fairly high wind blowing and the last half hour of the test was finished in the snow storm. All three models were equipped with Delco self-starters and generators which were connected and in use.

Fan belts were on and the fans were operating. Before the start of the contest the motors were run until all the gasoline in the tank, line and the carbureter was used up and the pipe lines from the tanks to carbureters were inspected to see that no other leads ran into them. Marvel carbureters were used on all three models. No adjustments of the carbureter were made on either the B-55 or the B-37, but the model B-25 carbureter had to be adjusted just after the start, this adjustment being accomplished while the motor and car were running.

Model B-55 has six cylinders of 3 3-4 by 5 inches; weight with four people at the end of the test, 4,550 pounds; driver, Edward Lyen; observer, Darwin S. Hatch. Model B-37 has four cylinders of 3 3-4 by 5 inches; weight with four people at the end of the test, 3,780 pounds; driver, Harold Larson; observer, R. L. Parker. Model B-25 has four cylinders of 3 3-4 by 3 3-4 inches; weight with four people at the end of the test, 3,300 pounds; driver, Al Meiser; observer, F. E. Edwards.

—

Merger of Chicago Co. and Kissel Branch

CHICAGO, ILL., Jan. 21—*Special Telegram*—The merger of the local interests of the McDuffee Automobile Co., of Chicago, and the Kissel Motor Car Co., Hartford, Wis., is announced today. The McDuffee company will act as agent for trucks and passenger cars of the Hartford concern for territory included by Illinois, Indiana, Iowa and part of Michigan. Kissel service building in this city will continue to care for service under the new régime and probably present Kissel car sales department will be continued as an additional salesroom for the McDuffee company, which will continue to handle Peerless cars and Rauch & Lang electrics.

—

NEW YORK CITY, Jan. 17—The United States Light and Heating Co. has changed its New York City branch sales office from 30 Church street to 210 West 50th street.

Job-Seekers Thick Around Ford Plant

DETROIT, MICH., Jan. 17—For the information of the thousands of men flocking to the Ford plant employment office, even before the dawn of day, large signs were posted Saturday morning stating that absolutely no men would be hired at the factory office. The company is said to be hiring men for the present only through its agents, circulating at the edge of the crowds and through other agents working throughout the city, who are picking up men of known worth. This is necessary, for if the gates of the employment office were opened the rush would undoubtedly result in serious injuries. A near panic of just this sort took place on Monday when the regular men of the factory started to work on the new eight-hour schedule. The men with jobs got so mixed up in the crowd of job seekers that a rush through the gates started, and in order to hold the mob in check the police were forced to turn the fire hose upon them.

Company Will Not Hire Outsiders

It is not the intention of the company to take on any of the outsiders that are flocking into town, nor men that are already employed. Only those from Detroit's unemployed will be engaged at present. When the company gets ready to hire a large number this will probably be done at a farm near the plant where the danger of a stampede will be less.

A rumor that several hundred Hungarians, Greeks and Russians had lost their jobs because of laying off a day last week for the celebration of the Greek Christmas was denied by the Ford company. Some of the men were sent home, however, in order to recover more fully from the results of their celebration, but they were not discharged. Mr. Ford says that no discrimination will be made against foreign labor, and that all will be treated alike.

Just what effect the Ford move will have upon the wages paid to the employees of the city of Detroit, if the new charter, soon to be voted upon, becomes effective, is still a question. The charter provides a minimum wage of $2.25 a day for common labor. It also says that "No employee in the classified service doing the work of a skilled mechanic shall receive compensation in a sum less than the highest prevailing wage in that particular grade of work." Whether this provision will mean that the city will have to pay wages equal to those at the Ford plant for the same class of labor is one of the local political questions.

Y. M. C. A. to Increase Classes

The Detroit Y. M. C. A. has made preparations for increasing the size and scope of its classes in automobile construction in order to help those who wish to enter the automobile field more than ever since Mr. Ford's announcement. Thirty-five new enrollments have been received in this department during the past week.

Another item dependent upon the new wages at the Ford plant will be the increase of injury benefits under the compensation law, which rules that an injured man shall receive one-half his weekly wage provided that the compensation exceeds $4 and is not over $10 per week.

The distribution of the $10,000,000 to the workers in the Ford Motor Co. instead of to the stockholders will deprive the government of nearly $600,000 of income tax, for the seven stockholders of the company probably all have incomes of over $500,000 a year, above which sum the tax is 6 per cent. Very few of the workers sharing in the profit will have their incomes raised by it even into the minimum class for taxation. In this way the government will be deprived of practically all income revenue from the big sum to be divided.

Highland Park, where the Ford factory is located, is already beginning to feel an influx of residents. They also hope for the elimination of a certain class of the foreign labor which has been very undesirable in the town. Real estate values are steadily increasing and this may be one phase of the working out of Ford's plan which will work a hardship upon those not working in his plant.

Big Shipments of Cars for the Orient

TACOMA, WASH., Jan. 14—December was the second heaviest month in the year in the value of automobile exports through the port of Tacoma, according to figures obtained from the Harbormaster. Nearly $40,000 worth of cars were shipped for points in the Orient, chiefly for Manila. The machines crated for over-seas shipment passed out at an average valuation of about $1,000. Total automobile exports from Tacoma for 1913 amounted to 351 packages, equivalent to the same number of machines, valued at $326,994.

January, 1914, is expected to be a good month, and already there is listed for shipment on the Blue Funnel liner *Protesilaus* seven carloads of Hupmobile and Overland motor cars which are consigned to leave Tacoma January 21 for Manila. The table of shipments and values, month by month for 1913, follows, and does not include the accessories shipped.

MONTH	NO. CARS	VALUE
January	42	$33,464
February	23	31,022
March	41	33,001
April	27	21,187
May	27	18,333
June	16	26,130
July	42	45,018
August	27	30,037
September	28	27,509
October	11	13,829
November	26	22,363
December	41	39,770
Total	351	$326,994

Herreshoff Reduces Prices

DETROIT, MICH., Jan. 19—The Herreshoff Motor Co. announces material reductions in the prices of its six-cylinder models to take effect at once. The roadster, six-passenger and five-passenger cars fitted to the six-cylinder chassis which have formerly been listed at $1,850 are henceforth to be sold at $1,600, while the seven-passenger model is reduced from $1,900 to $1,650. The four-cylinder models have not been reduced.

To take care of the greater demand due to this lower figure Mr. Herreshoff states that the production of the sixes will be increased fourfold.

Gurney Ball Bearing Elects Officers

JAMESTOWN, N. Y., Jan. 20—*Special Telegram*—At the annual meeting of the Gurney Ball Bearing Co., held here today, the following directors were elected by the stockholders: William T. Falconer, Alfred E. Hall, Henry K. Smith, E. Snell Hall, Frederick W. Gurney, Fred J. Galloway and Arthur W. Kettle. This constitutes entire board, which is to serve for 1 year. At the directors' meeting later, the following officers were elected: President, Wm. T. Falconer; vice-president, Henry K. Smith; secretary, Arthur W. Kettle; treasurer and general manager, S. Finser Baker. The important developments of the entire meeting, aside from the general reports of satisfaction, was the fact that, notwithstanding existing conditions, the company has shown a marked increase in gross business over the previous year with every indication of far outstripping the 1913 record during the coming year. It was definitely decided to add additional machine equipment to care for the assured increase.

Waverley Co. Has Prosperous Year

NEW YORK CITY, Jan. 16—At the recent meeting of stockholders of the Waverley Co., in Indianapolis, Ind., it was shown that the company enjoyed a prosperous business during the last year. The business for the year reached $1,312,815.94, and $441,336.64 was spent for salaries and wages. The company's surplus and undivided profits now amounts to $590,000, although the capitalization is but $190,000. The directors and officers were elected as follows: President, W. B. Cooley; vice-president, H. H. Rice; secretary, W. C. Johnson; treasurer, William Kothe; directors, Hugh Daugherty, J. C. Schaf, A. C. Ayres and H. M. Love.

Gray Is Gray & Davis Manager

BOSTON, MASS., Jan. 20—William H. Gray, until recently sales manager of Gray & Davis, Inc., has been made general manager of the company with headquarters in Boston. Mr. Gray, while exercising general supervision over the organization, will keep in close contact with the sales end of the business and direct the selling policy of the organization as heretofore.

Five New Cars Appear on the Market

CHICAGO, ILL., Jan. 20—*Special Telegram*—The Herff-Brook Corp., of Indianapolis, announced a surprise for the Chicago show, where it will display for the first time the Herff-Brook car made in two models, a four and a six. Heretofore, the company has confined itself to marketing the Marathon car, but now it has decided to make cars also. The new Herff-Brook six-cylinder will list at $1,375 and the four at $1,000. Both are fitted with an electric starter, the Jesco, without extra cost. The six motor is 4 by 4 1-2 inches and the four, 4 1-8 by 5. The six wheelbase is 124 inches and the four 116. The six will weigh 3,300 pounds. The new cars will be made in the old Wayne plant at Richmond, Ind., and will come as five-passenger touring cars and two-passenger roadsters.

Lincoln Highway Roadster Announced

DETROIT, MICH., Jan. 16—The latest addition to the industry is the Lincoln Motor Car Co., which announces a three-passenger light car model, called the Highway roadster. It has left drive, center control, electric lights, and will sell for $595. A speed of 50 miles per hour and a gasoline consumption of one gallon every 30 miles is claimed for it.

The motor is thermo-syphon cooled and has cylinders measuring 3.12 by 4 inches cast in a block. The intake manifold is integral with the cylinders. The valves are inclosed. A cone clutch is fitted and the two-speed sliding gearset is made a unit with the motor, the whole being suspended on three points. Lubrication is by splash, and ignition is obtained by magneto and battery.

The front axle is an I-beam construction and the rear a semi-floating type, with 30 by 2-inch and 30 by 3-inch wire wheels fitted thereto. The pressed steel frame is carried on half-elliptic springs in front and three-quarter in the rear.

Regular equipment includes top, windshield, speedometer and a full set of tools, while an electric starter is furnished as an extra. Lighting is by storage battery.

Oxford Six Is Latest Canadian Car

MONTREAL, QUE., Jan. 16—A new car to be seen at the forthcoming Montreal motor show opening January 24 is the Oxford, a Canadian entry into the six-cylinder field. The engine has a bore and stroke of 3.75 by 5.25 inches and develops 48 horsepower at 1,500 revolutions per minute. The drive is at the left with the central position for the control levers.

The equipment includes a complete electric lighting and starting system. The clutch is of the dry plate multiple disk type. A four-speed transmission is fitted integral with the motor which is supported on the three-point principle. Ignition is by Bosch duplex system entirely separate from the lighting generator circuits. The rear axle is of the full floating type with a pressed steel casing. Suspension is by semi-elliptics in front and three-quarter springs behind.

The under-cowl position has been adopted for the gasoline tank, the fuel flowing by gravity. The wheelbase of all models is 123 inches and the tires fitted are over-size 35 by 4.5 inches on demountable rims. Clear running boards are obtained by locating the tool box and tire carriers at the rear.

Dominion Car on Market

ST. JOHN, N. B., Jan. 19—The Dominion Motor Car Co. is a newly organized company with a capital of $400,000, largely subscribed in the United States and having connected with it such prominent men as P. A. Rockefeller, J. M. Kilburn, president of the National City Bank; J. H. Flagler and Geo. F. Vincent. This company has purchased the Maritime Motor Co. and 2 acres of land at Coldbrook.

A contract for the erection of a building to cost $65,000 has been placed with the T. A. Gillespie Co., of New York, and the work will commence within sixty days. Ninety thousand dollars worth of machinery has been ordered from a well-known New York firm.

Model cars will be assembled and placed among agents by March 1 of this year. It is estimated that 300 hands will be employed at the start.

New Car with Kerosene Carbureter

CLEVELAND, O., Jan. 20—Local capital, associated with Francois Richard, a French engineer, is to produce one of the first American cars with kerosene carbureter as standard equipment. Not only the carbureters but the motors, too, are especially built to use the cheaper fuel. The Richard Automobile Mfg. Co., has been incorporated with $250,000 capital.

F. M. Brady, of the Cleveland Brick & Clay Co. and G. C. Gordon, of the Park Drop Forging Co., with engineer Richard, head the organization. The car is now being manufactured in New York but many of the parts are made after Richard's designs in Cleveland shops.

Engineer Richard, who has been in this country 9 years, is the designer of several automobiles and was one of the first to produce a kerosene-burning car. He claims that with four cylinders, of four-cycle type, he produces in his latest car 90 horsepower and that his car can be driven 30 miles on a gallon of fuel. The car is made in one chassis and body only, that being the seven-passenger touring car with 128-inch wheelbase.

Gives New Fords for Old Cars

DETROIT, MICH., Jan. 19—The Loveland Co. of Detroit, which is well known in the Middle West for its reliability in the sale of used cars, has extended the scope of its operations by recently opening branches at 671 Main street, Buffalo and at Euclid avenue and 17 street, Cleveland. One of the features of the organization is its agreement with the Ford Motor Co. by which it can give new Fords in exchange for the used cars of all kinds that it takes in. This is important to car owners because the Ford branches will not deal in second-hand cars. H. B. Loveland is general manager of the company, H. C. Loveland has charge of the Buffalo branch and R. S. Merriam is branch manager at Cleveland.

Stafford Will Produce 125 Cars

KANSAS CITY, MO., Jan. 19—The Stafford Motor Car Co., located here, will increase its output this year to about 125 cars, according to announcements just made. Two models will be built this year, a five-passenger touring car and a two-passenger roadster, both with four-cylinder valve in head motor and forty horsepower. The new models will have a wheelbase of 115 inches and the cylinder bore will be 4 1-4 by 5 1-8. The car is described as having a full floating rear and I-beam front axles. It will be equipped with the Rushmore starting and lighting system and will sell for $2,350, f.o.b. Kansas City. The Stafford company's cars are sold principally in Missouri, Kansas, Oklahoma, Texas and Nebraska.

Electric Vehicles Invade Rural Field

BOSTON, MASS., Jan. 19—The Electric Vehicle Assn. of America has started a campaign to spread out from the main centers and invade the rural field with electric machines, and one of the first, if not the first such move took place last Thursday when the New England section invaded Salem. There was a parade at 3 in the afternoon through Salem, Beverly and Peabody followed by a dinner at the Board of Trade rooms at 6. In the evening there was another parade, this time of illuminated and decorated vehicles after which another meeting was held and speches were made by men prominent in the industry. There were some fifty machines, pleasure and commercial in the parades. Another city will be invaded in a few weeks along similar lines and this will be continued until about all the New England territory has been covered and the electric vehicle introduced everywhere.

Edsel Ford to Head New Co.

DETROIT, MICH., Jan. 19—Edsel Ford, vice-president of the Ford Motor Co., and son of Henry Ford, will head the new company for the manufacture of a light-weight, low-priced electric automobile. This new car is being designed to take a battery which is now being developed by Thomas A. Edison. It is expected that these cars will be ready for the market some time during the present year. They will be manufactured here in Detroit and will sell for about $600. It is too early as yet for Mr. Ford to announce the probable size of the production program.

Lovell-McConnell Sues Johns-Manville

Allege Infringement of Klaxon Patents by Hand-Operated Long Horn Marketed by the Defendant

NEW YORK CITY, Jan. 20—Suit for an accounting, damages and an injunction has been filed in the Federal Court, Southern District of New York, by the Lovell-McConnell Mfg. Co., Newark, N. J., against the H. W. Johns-Manville Co., New York City, for infringement of the Klaxon basic patents, Nos. 923,048, 923,049 and 923,122, granted May 25, 1909. The infringement complained of is a hand-operated automobile horn, known as the Long horn, made by G. Piel & Co., Long Island City, and marketed by the Johns-Manville Co., this city.

The patents sued on are the ones which Judge Chatfield sweepingly sustained in an elaborate opinion, recently handed down in the Brooklyn suit against the Newtone horn. In the present suit against the Long horn the bill of complaint recites this favorable decision of the Brooklyn Court as one of the grounds for granting the preliminary and permanent injunctions prayed for in the bill.

This is the first suit brought against a hand-operated horn, since the recent decision. This not only included motor-actuated horns, but also hand-operated ones. The suit against the Newtone, which was filed on March 30, 1911, was generally considered a test case, the outcome of which will naturally affect the other suits against the following concerns: The Sparks-Withington Co., Jackson, Mich; the Square Horn Mfg. Co., this city, and about four different suits in Michigan.

The temporary restraining order issued January 14 to the Johns-Manville company, preventing Lovell-McConnell from interfering with its advertising contracts, etc., was vacated by Judge Ward yesterday. The Johns-Manville company states that it is going to carry the matter to the U. S. Circuit Court of Appeals.

Barber Claims Pittsfield Plug Infringes

NEW YORK CITY, Jan. 20—William Barber and Emil Grossman have brought suit in the U. S. District Court for the Southern District of New York, against the Western Electric Co., this city, for an alleged infringement on their patent No. 723,032. granted to William Barber, Brooklyn, N. Y., for a spark plug with an insulator consisting of a combination of porcelain and a less fragile substance.

Grossman recently bought a fifth interest in the patent, the Red Head Plug, which he manufactures, thereby ceasing to be an infringement. The complainants claim that the Pittsfield plug, made by the Western Electric Co., was offered for sale at the recent automobile show, and ask for $10,000 damages. This plug is known as a combination porcelain-mica spark plug. The mica top is made of selected mica washers assembled over a pure mica tube under heavy pressure. The mica protects the plug against mechanical injury while the porcelain provides perfect insulation, it is claimed.

Action to Enforce Liability of Stockholders

NEW YORK CITY, Jan. 20—An action to enforce the liability of the stockholders of the Wishart Dayton Auto Truck Co., this city, for the debts to its employees, has been brought in the Supreme Court, Appellate Term, by William Farnum vs. William H. Harrison, defendant-respondent, impleaded with the other defendants. The plaintiff was a bookkeeper for the Wishart Dayton Auto Truck Co., and the action was brought to enforce the liability of the stockholders for the plaintiff's wages or salary under section 57 of the Stock Corporation Law. It is claimed by the respondent that the plaintiff was a bookkeeper and as such was not entitled to the remedy against the stockholders. The court below dismissed the complaint upon the ground that the statute does not include "bookkeepers" and that therefore the plaintiff is not entitled to its benefits.

The question then arose, should the statute be construed as to include the plaintiff, who was a bookkeeper? Section 57, above mentioned, provides as follows: "Liability of stockholders to laborers, servants or employees. The stockholders of every stock corporation shall jointly and severally be personally liable for all debts due and owing to any of its laborers, servants or employees other than contractors for services performed by them for such corporation." This statute in express terms includes all employees other than contractors, and inasmuch as a bookkeeper is concededly an employee, the Court has no hesitation in stating that in its opinion the plaintiff is plainly within the purview of the statute and entitled to recover.

"The Court is of the opinion that a fair, honest and sensible construction of the statute, one that is fairly within the legislative intent and consonant with the general meaning and understanding of the terms used and with the beneficial purpose intended, leads to a reversal of the judgment."

"Judgment should be reversed and a new trial ordered, with costs to the appellant to abide the event."

B. & L. Lamp Answers Wagner

NEW YORK CITY, Jan. 20—The B. & L. Auto Lamp Co. has answered the bill of complaint brought against it by A. F. Wagner in the United States District Court of the Southern District of New York. Mr. Wagner claimed an infringement on patent No. 1,067,891, on certain improvements on a motor cleaner. The defendant admits that the patent was issued to Wagner, but that before January 22, 1912, when it was issued to him, he was not the first inventor of the cleaner. It also denies infringement and states that the patent is void for lack of novelty. It names five other inventors who had patents granted to them prior to his invention.

K-W Ignition Restraining Imitators

CLEVELAND, O., Jan. 17—The K-W Ignition Co. has filed suit in the Common Pleas Court of Cuyahoga County, O., against the M. & M. Co., of this city, for $10,000 damages and has secured an injunction restraining them from offering and selling imitation springs and contact points as K-W.

Two More Take Canfield Licenses

NEW YORK CITY, Jan. 21—The McCormick Mfg. Co., Dayton, O., and the Eastern Machine Screw Corp., New Haven, Conn., have taken out licenses under the Canfield patent, No. 612,701.

Automobile Securities Quotations

No changes of any consequence occurred in this week's automobile securities quotations.

	1912 Bid	1912 Asked	1913 Bid	1913 Asked
Ajax-Grieb Rubber Co., com	180	200	195	..
Ajax-Grieb Rubber Co., pfd	95	101	98	101
Aluminum Castings, pfd	98	101	97	100
Chalmers Motor Company, com	..	..	..	92
Chalmers Motor Company, pfd	..	..	93	95
Kelly-Springfield Tire Co., com	19	21	48	50
Kelly-Springfield Tire Co., pfd	70	75	114	118
Firestone Tire & Rubber Co., com	334	338	246	..
Firestone Tire & Rubber Co., pfd	105	107	104	..
Garford Company, preferred	100	102	80	90
General Motors Company, com	33	34	46	46½
General Motors Company, pfd	76	78	84¾	86
B. F. Goodrich Company, com	62½	63¼	21	21½
B. F. Goodrich Company, pfd	104	105	80½	82⅝
Goodyear Tire & Rubber Co., com	448	452	235	242
Goodyear Tire & Rubber Co., pfd	104	105	98	..
Gray & Davis Co., preferred	..	..	90	100
Hayes Manufacturing Company	..	90	..	..
International Motor Co., com	5	10	..	5
International Motor Co., pfd	40	60	..	15
Kelly-Springfield Motor Truck Co., com	..	..	..	..
Kelly-Springfield Motor Truck Co., pfd	..	..	..	..
Lozier Motor Company, com	..	..	..	15
Lozier Motor Company, pfd	..	..	..	80
Maxwell Motor Co., common	..	..	4	4¼
Maxwell Motor Co., 1st pfd	..	..	26	27
Maxwell Motor Co., 2nd pfd	..	..	7	7½
Miller Rubber Company	170	175	124	130
New Departure Mfg. Co., com	..	..	120	125
New Departure Mfg. Co., pfd	..	..	100	103
Packard Motor Company, pfd	103	105	95	100
Palmer & Singer, pfd	..	..	..	65
Peerless Motor Company, com	..	..	15	25
Peerless Motor Company, pfd	..	..	75	80
Pope Manufacturing Co., com	33	35	..	2
Pope Manufacturing Co., pfd	78	80	..	12
Portage Rubber Co., com	..	..	..	40
Portage Rubber Co., pfd	..	..	..	90
Reo Motor Truck Company	10	11	6½	7½
Reo Motor Car Company	20¼	21	14¾	15½
Rubber Goods Mfg. Co., pfd	104	108	105	115
Russell Motor Car Co., com	..	..	..	40
Russell Motor Car Co., pfd	..	..	..	70
Splitdorf Electric Co., pfd	..	..	40	50
Stewart-Warner Speedometer Co., com	..	..	51½	52½
Stewart-Warner Speedometer Co., pfd	..	..	94	96
Studebaker Company, com	33	35	23	25½
Studebaker Company, pfd	92	95	73½	76
Swinehart Tire Company	110	112	69	71
U. S. Rubber Co., com	..	..	59¼	59½
U. S. Rubber Co., 1st preferred	..	..	102½	103
Vacuum Oil Co	..	..	199	202
White Company, preferred	105	108	105	110
Willys-Overland Co., com	72	73	61	63
Willys-Overland Co., pfd	98	99	88	91

Jersey May Tax 60 Cents Per H. P.

Vigorous Protest By Motorists —Massachusetts May Welcome Tourists—Test Michigan Law

TRENTON, N. J., Jan. 15—If the Legislature looks with favor upon the suggestion contained in the annual report of State Commissioner of Motor Vehicles J. H. Lippincott, made public today, New Jersey will have a practical method for increasing its revenue. Not only will the scheme provide more money for the maintenance of the state's roads, but it will afford funds to be devoted to other purposes. His recommendation is that the present schedule of fees be repealed and that 60 cents per horsepower be charged for all registrations, unless automobiles are exempted from personal taxation, when he would advise that the fee be about $1 more a horsepower. At present the charge is $4.50 for horsepower up to 10, $7.50 from 10 to 29, and $15 for 30 or more. He says the new schedule would insure a revenue to the state of $1,500,000, as against about $750,000 for the coming year.

The report shows that a total of $72,781.68 was in bank to the credit of the department at the close of business on December 31; that the total receipts of the department during the year were $661,446.31, as against $496,653.35 in 1912. Fines collected amounted to $21,285.31, as against $15,136 for 1912. There were 49,588 automobile licenses issued, as compared with 43,919 the previous year; 8,419 motorcycle registrations, as against 6,188 in 1912; 55,246 drivers' permits, as against 51,145 for last year.

The commissioner recommends the compulsory reporting of accidents by owners or drivers, establishment of a traffic commission to formulate road rules, police power for inspectors, increasing of the number of special inspectors to thirty, uniformity of laws and policies between states, enactment of a law for the licensing of motor buses, and regulation of searchlights and prohibition of the use of muffler cut-outs.

Vigorous Protest Against New Jersey Fee Increase

TRENTON, N. J., Jan. 19—A vigorous protest against the proposed increase of automobile fees to 60 cents a horsepower was filed with Commissioner Lippincott by the chairman of the legislative committee of the N. J. Automobile Assn. He said that the automobilists of that state were being discriminated against by the proposed increase, which would double the present license fees.

Despite the protest, the bills will be introduced, Senator McGinnis, the Democratic leader, said, because the state needs the money. There are two bills—one increasing the license fees, the other exempting them from local taxation. It passed the revenue from automobile licenses will be increased from $750,000 to $1,500,000. The state wants to keep $500,000 of this for its own use, the remainder being devoted to the roads.

Massachusetts May Welcome Motorists

BOSTON, MASS., January 19—A slight change for the better seems to have come over the Massachusetts Highway Commission, judging from a few sections of its annual report to Governor Walsh, the newly elected executive. It now recommends that motorists from other States be welcomed to Massachusetts. When it is remembered that Chairman Sohier of the commission was the chief factor in putting through the 10-day limit on visiting motorists, a law that kept a lot of people out of Massachusetts to the regret of hotel men, also that other States copied the law creating trouble for our motorists, this right-about-face on the part of the commission seems to augur well for the future of the motorists.

California Motorists Fighting New Law

SAN FRANCISCO, CAL., Jan. 16—The California Supreme Court is now reviewing the briefs in four different cases testing the constitutionality of the new automobile State law which became effective on January 1. Pending the court decision the peace officers are not enforcing the law, and up to date only about 40,000 motorists out of an estimated 90,000 in the State have registered under the new law.

The motorists are testing the law because of the provision regulating the license fee which is based on horse-power and forces owners to pay a minimum of $5 and up to $30 annually for the registering of cars. Half of the fee collected goes to the maintenance of the motor vehicle department and the other half to the county, from which the fee was paid for the maintenance of roads, provided the county has a road fund, otherwise it is held by the State treasurer. This the motorists claim is double taxation, for they are forced to pay personal property taxes on their cars and according to the statutes a portion of this goes to the road building and maintenance fund. The motorists have some of the best legal talent in the state presenting their case and they are hopeful of a victory, as similar laws were recently declared invalid in Ohio and several of the Middle West states.

To Test Michigan Motor Law

DETROIT, MICH., Jan. 20—The right of Michigan cities and towns to control motor car traffic is to be taken to the State Supreme Court for decision as a result of a demurrer filed in the case of a Detroit automobilist, who hit a woman while, it is said, he was violating two city ordinances in driving recklessly and without lights. The state law says that "no city shall regulate the speeding and use of motor vehicles on the streets and public highways except as specified herein." Of course this provision was made to keep towns from making unreasonable regulations but it is feared if the ordinances involved in the case are declared void that the Detroit traffic squad will become powerless. This would be a calamity for both motorists and pedestrians as the Detroit squad is very efficient. The first hearing on the question will be held January 22 and the corporation counsel will personally handle the case for the city.

Chauffeurs Must Be 21, New Bill Says

NEW YORK CITY, Jan. 21—Three reform automobile acts were introduced at Albany yesterday, by Assemblyman Conkling. One prohibits a license to a chauffeur convicted of a felony. A second divides the registration fees between State and County. A third prohibits employment of chauffeurs less than 21 years old.

State Collects $1,275,727.27 in 1913

NEW YORK CITY, Jan. 30—A tabulation of the automobile registrations by counties for 1913, together with the fees paid for automobile licenses, was issued by the Secretary of State's office. It shows that a total of 118,466 pleasure cars and 13,780 commercial cars were licensed in this State last year. Chauffeurs to the number of 56,702 were licensed, and the State collected from all these sources $1,275,727.27.

Market Changes of the Week

A few important changes occurred in this week's market reports. Tin advanced both in the foreign and domestic markets. The consumers' inquiries were larger in number and the operators were more interested in future positions. Tin closed at a gain of $1.12 per 100 pounds. Both Bessemer and Open-Hearth steels dropped $1.00 per 10 pounds. Lead remained steady but dull, at $4.07 1-2 per 100 pounds.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony	.06	.06	.06	.06	06	.06	.....
Beams & Channels, 100 lbs.	1.31	1.31	1.31	1.31	1.31	1.31	.....
Bessemer Steel, ton	20.00	19.00	19.00	19.00	19.00	19.00	—1.00
Copper, Elec., lb.	.14	.14	.14¼	.14¼	14½	14 7/20	+ .00 7/20
Copper, Lake, lb.	.14¼	.14¼	.14½	.14¼	14¼	14½	+ .00¼
Cottonseed Oil, bbl.	6.98	6.92	6.80	6.85	6.91	6.95	— 03
Cyanide Potash, lb.	.17	.17	.17	.17	.17	.17	.....
Fish Oil, Menhaden, Brown	.40	.40	.40	.40	.40	.40	.....
Gasoline, Auto, 200 gals.	.22¼	.22¼	.22¼	.22¼	.22¼	.22¼	.....
Lard Oil, prime	.93	.93	.93	.93	.93	93	.....
Lead, 100 lbs.	4.07½	4.07½	4.07½	4.07½	4.07½	4.07½	.....
Linseed Oil	.52	.52	.52	.52	.52	52	.....
Open-Hearth Steel, ton	20.00	19.00	19.00	19.00	19.00	19.00	— 1.00
Petroleum, bbl., Kansas, crude	1.03	1.03	1.03	1.03	1.03	1.03	.....
Petroleum, bbl., Pa., crude	2.50	2.50	2.50	2.50	2.50	2.50	.....
Rapeseed Oil, refined	.62	.62	.62	.62	.62	.62	.....
Rubber, Fine Up-River, Para	.75	.75	.75	.75	.75	.74	— 01
Silk, raw Italy.	....	....	5.15	....	....	5.15	.....
Silk, raw Japan.	....	....	4.15	....	....	4.13	— 02
Sulphuric Acid, 60 Baume	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.	36.63	36.88	37.00	37.00	37.45	37.75	+1.12
Tire Scrap	.04½	04½	.04½	.04½	.04½	.04½	.....

Three Makers of Electrics Combine

The American Electric Car Co. Takes Place of Argo, Brock and Borland-Grannis Co.'s—Will Reduce Manufacturing Cost

CHICAGO, ILL., Jan. 21—*Special Telegram*—A new influence is injected into the electric car situation by the formation of the American Electric Car Co., a $1,500,000 corporation, the result of a merger of the Argo Electric Vehicle Co., Saginaw, Mich., the Borland Grannis Co., Chicago, and the Brock Electric Co., Cleveland, O., the final details of which were perfected today. The three makes of cars manufactured by these concerns will be marketed under their present names by the new company and the existing agencies undoubtedly will be continued in their present form. The officers of the American Electric Car Co., are: President, F. A. Brand; vice-president, Fred Buck, Bruce Borland, and U. B. Grannis; secretary and treasurer, Theodore Huss. All of the three constituent companies of the new organization are represented on the executive board and on the board of directors. The strength of the new organization may be judged by the fact that the assets of the three companies taken over are held as an encumbrance by the American Electric Car Co.; and in addition, a large amount of new capital has been acquired, it is stated, enabling the company to further extend the business heretofore carried on by the separate institutions. According to one of the officers of the new corporation, a great saving in manufacturing and material costs is expected on account of the large production assured the organization, the machinery and general manufacturing equipments of each of these distinct plants being of the best. In addition to the reduction in overhead expenses, selling costs will be reduced, it is believed, on account of the distribution of the product through one marketing organization.

Safety First Society Organized

NEW YORK CITY, Jan. 20—The Safety First Society was organized yesterday at the Astor hotel. Its object is to make the streets, transportation lines, and buildings of the city as safe as scientific knowledge, adequate laws, and the greatest care can make them. To obtain this result, the organization proposes to consolidate and extend the present unrelated activities of civic organizations, automobile clubs and associations, public service corporations, and insurance companies, and to conduct a vigorous publicity campaign to impress upon all users of public streets and places their duties with respect to public safety. Several automobile men are trustees.

A meeting of the trustees will be held at the earliest possible date for the election of officers and the appointment of an executive committee. F. H. Elliott will act as secretary, with offices at the Hotel Astor, until organization is completed.

Michigan Buggy Creditors Get 5% Dividend

DETROIT, MICH., Jan. 20—The Detroit Trust Co,. trustee in bankruptcy of the Michigan Buggy Co., is sending out to the creditors of the Kalamazoo concern a 5 per cent. dividend and a condensed report under date of January 20. The report shows that since its appointment, August 27, 1913, the trust company has sold all the cars returned or at the factory. The receipts from the sale of part of the personal property will not exceed the $225,000 guaranteed by the auctioneer. The bid of $40,000 for the real estate has been reported to the court without recommendation, although the trust company has made it known that it thinks that $50,000 should be received for this. There has been considerable difficulty in regard to liquidating the notes of dealers who held cars. A compromise has been effected by which the banks holding dealers' notes will turn over approximately $112,000. It is hoped by the trust company that a second dividend can be paid in about three months.

A Step in Columbus Buggy Reorganization

COLUMBUS, O., Jan. 19.—Another step has been taken in the proposed reorganization of the Columbus Buggy Co., which has been operated by a committee of creditors since June of last year. At a meeting of the creditors held January 15 the proposition of Frank L. Chase and others to buy the property for 10 cents on the dollar in cash and 40 cents on the dollar in bonds of the proposed company was rejected.

It was decided that the reorganization should be made by the creditors themselves and a committee consisting of O. A. Miller, J. W. Kavanaugh and Frank L. Stein was named to work with the present creditors' committee in preparing a plan for reorganization. It is believed that by exchanging stock in the new company for claims, dollar for dollar, and the issuance of about $100,000 bonds for working capital, the plant may be operated at a profit.

The report showed that the operation of the plant by the creditors' committee has been at a loss and there is a gradual shrinking of the assets of the company. The new committee is to report the reorganization plan at once.

Century Electric Adds $100,000

DETROIT, MICH., Jan. 20—At a meeting of the stockholders of the Century Electric Car Co. on January 16, the present officers were all re-elected as follows: John Wynne, Jr., president; Philip Breitmeyer, vice-president and treasurer; C. L. Weeks, vice-president and John Gillespie, general manager. It was also decided at this meeting to increase the capital stock from $100,000 to $200,000, the issue to be taken up within the organization. This move is done principally with the idea of materially increasing the production of the Century electrics which are well known in this city.

Jeffery Sells 6,000 Cars in 60 Days

KENOSHA, WIS., Jan. 20—Six thousand cars in 60 days is the sale's record credited to the Thomas B. Jeffery Co., maker of the Jeffery four and six. The Jeffery factory organization ushered in the New Year with the factory working New Year's Day to fill orders for immediate shipment. By the middle of January the factory atttained its maximu output of thirty cars a day, which rate will be continued until all 1914 orders have been filled.

Disco Plant Sold for $27,600

DETROIT, MICH., Jan. 20—The bids on the Disco properties were reopened by the court on January 15 and several new bids were made. Mansell Hackett, of London, England, made a bid of $27,600, which was approved by the court. The highest bid at the first sale was $17,200. Part of the new bid was paid down and the remainder, covered by a bond, is to be paid within 90 days.

Mr. Hackett is taking the business up where the Disco Co. left off and will operate it under the old name. He expects to specialize on a universal starter which may be attached to any car already in use. The cost of the regular type of starter will be considerably reduced.

Holt-Chandler Co. Reorganized

NEW YORK CITY, Jan. 19—At a meeting of the board of directors of the Holt-Chandler Co. held Saturday, F. W. Dreckstrade's resignation as vice-president was accepted. He tendered his resignation owing to the fact that with his interests in the Junction Motor Co., Jersey City, he could not conscientiously perform his duties as manager of the Holt-Chandler Co. F. K. Jones, recently district manager with the Alco Co., was placed in charge of the sales department. L. W. Bitting, recently elected treasurer of the company, will now be able to devote more time to the wholesale end of the business.

Master for Walpole Tire Co.

BOSTON, MASS., Jan. 19—E. B. Gibbs, of Brookline, was appointed a master by the Federal Court today to pass upon the validity of nearly $1,000,000 in claims against the Walpole Tire & Rubber Co. Action on the question of selling part of the company's property was postponed for a week.

Factory Miscellany

VICTOR Auto Parts Plant—A manufacturing plant, costing close to $40,000, is to be constructed in Winton Place, O., by the Victor Auto Parts Co. The improvement will be about 200 feet square, two stories high and of mill construction. It will contain about 50,000 square feet of floor space. The new plant will enable the company to give employment to more than double the present working force.

Portage Rubber Will Add—The board of directors of the Portage Rubber Co., Barberton, O., have decided to build an addition to the plant at a cost of about $25,000.

Maccar Machinery Being Installed.—Machinery is being installed in the new manufacturing plant of the Maccar Truck Co., Scranton, Pa. The plant was recently moved from Allentown, Pa., where it had been operating since 1004.

New Conn. Automobile Plant—G. B. Clark and E. L. Nettleton, of Milford, Conn., have purchased a property at Oakville, a suburb of Waterbury, Conn., and will establish a factory for the manufacturing of automobiles and other vehicles.

Cyclecar Co. Buys Home—The plant of Knell & Adams, 1020 Beaufait avenue, Detroit, Mich., has been purchased by W. E. Scripps and will be occupied by the Scripps-Booth Cyclecar Co. within a week. The new quarters is three stories high with a basement, and is equipped with automobile manufacturing machinery.

Dominion Will Erect at Coldbrook.—New York capitalists have leased a site adjoining the Ford M. C. Co.'s property at Coldbrook, three miles from St. John, N. B., and state that the Dominion M. C. Co., Ltd., will erect an automobile factory. Names mentioned are H. M. Rockfeller, J. H. Flagler, J. A. Graham and L. F. Bond.

Wayne Auto Axle Plant Opened—By an order issued by Federal Judge A. B. Anderson, of Indianapolis, Ind., Joseph Doepker will open the plant of the Wayne Auto Axle Co. at Ft. Wayne, and run the business. Jobs that were to be turned out when the company went into the hands of a receiver will be finished and shipped.

Republic Rubber's Clubhouse Opened—The Republic Rubber Co. employees' clubhouse at Youngstown, O., was formally opened on January 15. The clubhouse is for the company's employees and the government of the same is by the employees. It is 60 by 130 feet in dimensions and 3 stories high. It has a dining room to accommodate 1,200 persons.

May Use Flanders Plant—The Pontiac Commercial Association, Pontiac, Mich., is working upon a proposition to put in operation one of the Flanders automobile plant buildings in the south end of the city. The original plan was to combine a Pittsburgh concern with a new organization and move the Pittsburgh plant to Pontiac, but the plans did not work out. These men are said to be connected with the sheet metal industry.

Concern Builds Model Homes—A model workingman's village is to be built adjacent to the Stevens-Duryea motor car plant at East Springfield, Mass. The model village is the enterprise of a number of Boston capitalists who propose utilizing a 60-acre property close to the Stevens-Duryea factory's new 40-acre tract. The present Stevens-Duryea plant employs 1,600 men, so those employees with their families, together with the additional forces working at the other plants in that section, will constitute quite a village by itself.

The Automobile Calendar—Shows, Meetings, Etc.

Jan. 17-24..... Detroit, Mich., Automobile Show.
Jan. 17-24..... Pittsburgh, Pa., Annual Automobile Show, Automobile Dealers' Assn.
Jan. 19-24..... Washington, D. C., Automobile Show, Convention Hall, Washington Automobile Dealers' Assn.
Jan. 24-31..... Montreal, Que., Automobile Show, Passenger Cars, Montreal Automobile Trade Assn.
Jan. 24-31..... Rochester, N. Y., Automobile Show, Exposition Park, Rochester Automobile Dealers' Assn.
Jan. 24-31..... Chicago, Ill., Automobile Show, Coliseum and First Regiment Armory.
Jan. 26-31..... Scranton, Pa., Automobile Show, Automobile Assn. of Scranton.
Jan. 27-31..... Portland, Ore., Automobile Show, Armory, Portland Auto Trade Assn.
Jan. 31-Feb. 7..... Minneapolis, Minn., Automobile Show.
Feb. ..... Hartford, Conn., Show.
Feb. ..... St. Louis, Mo., Show.
Feb. 2-7..... Buffalo, N. Y., Automobile Show, Buffalo Automobile Dealers' Assn.
Feb. 3-7..... Kalamazoo, Mich., Show.
Feb. 3-7..... Montreal, Que., Motor Truck Show, Montreal Automobile Trade Assn.
Feb. 4-7..... St. Joseph, Mo., Annual Show, St. Joseph Auditorium, St. Joseph Automobile Show Assn.
Feb. 9-14..... Seattle, Wash., Annual Automobile Show, State Armory Bldg., W. I. Fitzgerald, Manager.
Feb. 9-14..... Buffalo, N. Y., Truck Show, Buffalo Automobile Dealers' Assn.
Feb. 9-14..... Buffalo, N. Y., Commercial Car Show, Buffalo Automobile Dealers' Assn.
Feb. 9-14..... Grand Rapids, Mich., Fifth Annual Western Michigan Show, Klingman Furniture Exposition Bldg., *Grand Rapids Herald.*
Feb. 9-14..... Portland, Me., Second Annual Show, Dealers' Assn.
Feb. 11-14..... Geneva, N. Y., Automobile Show, State Armory.
Feb. 11-14..... Louisville, Ky., Show, First Reg. Armory, Dealers' Assn.
Feb. 14-21..... Pittsburgh, Pa., Automobile Show, Pittsburgh Auto Show Assn.
Feb. 16-22..... Kansas City, Mo., Auto Show.
Feb. 16-21..... Toronto, Ont., Automobile Show, E. M. Wilcox.
Feb. 17-21..... Salt Lake City, Utah, Automobile Show, W. D. Rishel.
Feb. 18-21..... Bloomington, Ill., Automobile Show, McLean County Automobile Club.
Feb. 18-21..... Albany, N. Y., Passenger Car Annual Show, State Armory, Albany Auto Dealers' Assn.
Feb. 21..... Santa Monica, Cal., Vanderbilt Cup Race.
Feb. 21-28..... Newark, N. J., Automobile Show, N. J. Auto Trade Assn.
Feb. 21-28..... Cincinnati, O., Automobile Show, Cincinnati Automobile Dealers' Assn.
Feb. 23..... Santa Monica, Cal., American Grand Prix.
Feb. 23-25..... Albany, N. Y., Commercial Show.
Feb. 23-28..... Indianapolis, Ind., Auto Show, Indianapolis Auto Trade Assn.
Feb. 23-28..... Omaha, Neb., Automobile Show, Omaha Automobile Assn.
Feb. 24-28..... Syracuse, N. Y., Automobile Show, State Armory, Syracuse Automobile Dealers' Assn.
Mar. 2-4..... Cincinnati, O., Commercial Vehicle Show, Cincinnati Automobile Dealers' Assn.
Mar. 3-7..... Fort Dodge, Ia., Show, Fort Dodge Auto Dealers' Assn.
Tiffin, O., Show, *Tiffin Advertiser.*
Mar. 7-14..... Hamilton, Ont., Passenger and Truck Show.
Mar. 7-14..... Boston, Mass., Automobile Show.
Mar. 9-14..... Des Moines, Ia., Show, Des Moines Automobile Dealers' Assn.
Mar. 17-21..... Boston, Mass., Truck Show.
Apr. 9-15..... Manchester, N. H., Automobile Show.
May 30..... Indianapolis, Ind., 500-mile Race, Indianapolis Motor Speedway.
July 3-4..... Tacoma, Wash., Road Races, Tacoma Carnival Assn.
July 4..... Sioux City, Iowa, 300 Mile Race, Sioux City Auto Club and Speedway Assn.
July 4..... Lyons, France, French Grand Prix.
July 13-14..... Seattle, Wash., Track Races, Seattle Speedway Assn.
July 25-26..... Belgium Grand Prix Road Races.
Aug. 28-29..... Chicago, Ill., Elgin Road Races, Chicago Automobile Club.
Sept. 9..... Corona, Cal., Road Race, Corona Auto Assn.
November ..... El Paso, Tex., Phoenix Road Race, El Paso Auto Club.

The Week in the Industry

Motor Men in New Roles

WOOD Firestone's Brooklyn Manager—The Firestone Tire and Rubber Co. has changed its policy in regard to the New York service station, and hereafter that station will serve all of Greater New York. The company has appointed H. S. Wood manager of the Brooklyn, N. Y., branch.

McKenzie Haynes Sales Manager—L. E. McKenzie, for many years identified with the Studebaker Corp., Detroit, Mich., has joined the Haynes Automobile Co., Kokomo, Ind.

Lawton Quits Bi-Motor—C. T. Lawton has severed his connection with the Bi-Motor Equipment Co., Boston, Mass., to become associated with the Wetmore-Savage Co., that city.

Ford Edison's Guest in Florida—Thomas A. Edison is preparing to leave with his family for his Winter home at Fort Meyer, Fla., early next month. Henry Ford will be his guest.

Snider Goes to Boston—H. J. Snider, formerly with the Alco Co. in New York, has gone to Boston to accept a position as salesman for the Lawrence & Stanley Co., agent for the Mitchell.

Donecker President Lehigh Club—The fifth annual election and banquet of the Lehigh Valley Motor Club was held recently, attended by nearly 200 members. E. A. Donecker was elected president.

Christensen and Jory Cyclecar Co. Heads—The Western Cyclecar Co. is headed by Carl Christensen and C. A. Jory of the Carl Christensen M. C. Co. They will establish a sub-agency in Los Angeles.

Hipple with Elliott Ranney—G. W. Hipple has become sales manager and an official of the A. Elliott Ranney Co., distributors of Hudson cars in N. Y. city. He is a National Cash Register graduate.

Aldrich in New Role—Jim Aldrich, who has been with the Firestone Tire & Rubber Co. for a number of years, will during the coming year travel the State of Washington looking after all the outside dealers.

Arling in Oklahoma City—F. J. Arling Jr., formerly of the Missouri district of the Goodyear Rubber and Tire Co. at St. Louis, Mo., has been sent to Oklahoma City., Okla., to manage the branch house of the company there.

Hines Montana District Manager—Harry Hines, formerly with the Spokane, Wash., branch of the Diamond Rubber Co., has accepted the position of Montana district manager for the H. L. Olive Co., Overland agents.

Glazier in Charge Truck Dept.—J. L. Glazier will have charge of the truck department at the Portland, Ore., branch of J. W. Leavitt & Co. He was formerly manager for the Speedwell people in San Francisco, Cal.

Rhoades President Dayton Co.—B. A. Rhoades has been elected president of the Stoddard-Dayton Maxwell Repair Co., which was recently organized at Dayton, O., with a capital of $10,000. R. E. Gerspacher is secretary-treasurer.

Gross Takes Dodge's Place—L. C. Dodge, manager of the Boston, Mass., branch of the Oldsmobile Co., has been transferred to San Francisco, and his place in the Hub has been taken by F. A. Gross, who was sent there from the factory.

Mahoney Joins Campbell's Staff—John F. Mahoney, formerly assistant automobile editor of the Boston American, resigned recently to accept a position as publicity man for Manager Chester I. Campbell in connection with the Boston automobile shows.

Connor Back in Boston—George H. Connor, formerly with the Rambler and Buick branches in Boston, Mass., and later manager of the Chevrolet Motor Co.'s branch in New York, has returned to Boston to join the W. L. Russell Co., agent for the Regal and Haynes cars.

Casebeer Goodyear Southwest Manager—F. H. Casebeer, formerly of Des Moines, Ia., and lately in charge of the Goodyear Tire & Rubber Co. branch at Oklahoma City, has been named as manager of the entire southwest for that company, with headquarters at St. Louis, Mo.

Evans in New Capacity—C. C. Evans, formerly sales manager of the Mitchell, Lewis & Staver Co.'s branch in Seattle, Wash., and later with the Cartercar distributors, is now in charge of the truck sales department of the Northwest Buick Co., Seattle, coming there from Minneapolis, Minn.

Ketcham Succeeds Pruden—Ralph Ketcham, formerly manager of the R & L branch in Boston, Mass., agent for the Garford products, has succeeded H. B. Pruden as manager of the New England branch of the Kisselkar Co. R. E. Taylor, of New York, has succeeded him in charge of the R & L branch.

Dunning with American Bronze—Leighton Dunning, formerly connected with the engineering department of the General Electric Co., Schenectady, N. Y., is now in charge of the laboratory and testing plant of the American Bronze Co., manufacturer of the Non-Gran fibrous bearing bronze, whose plant is located at Berwyn, Pa.

Stilwell Gets Dinner—A dinner was given recently in honor of G. H. Stilwell, who on January 1 assumed his new duties as corporation counsel of the city of Syracuse, N. Y. Mr. Stilwell, as a director of the H. H. Franklin Mfg. Co. and the Franklin Automobile Co. and vice-president of the latter, gives up his active connection with the Franklin to assume his new position. The dinner was given by H. H. Franklin, president of the automobile company bearing his name.

Auto Operators Elect Officers—The annual meeting of the Massachusetts Automobile Operators Assn. was held last week at the clubhouse in Boston and the following officers were elected: J. Edward Connors, president; Frederick Spain, first vice-president; J. P. Harriman, second vice-president; David Michaels, recording secretary; Charles F. Savery, financial secretary; G. J. McDonald, treasurer; W. G. F. Pratt, chairman, Samuel Sulkins and John Garrity, board of trustees.

Bay State Elects Officers—At the annual meeting of the Bay State A. A. last week new officers were chosen to head the organization, the older ones having had enough of the worry trying to steer the club past financial shoals. W. H. Stevens, agent for the National in Boston, was made president; J. J. McNamara, motor editor of the Boston Post, vice-president, and F. K. Swett, secretary-treasurer. As the club voted at a recent meeting to discontinue its headquarters at the Hotel Lenox, it is possible that rooms will be taken at the Hotel Oxford nearby.

Cavanagh In New Co.—Frank P. Cavanagh, of Chicago, Ill., has been appointed manager of the motor supply department of the Ph. Gross Hardware Co., 126 Grand avenue, Milwaukee, Wis., to succeed Louis Conne, who resigned to establish the Western Motor Supply Co., 406-408 Jefferson street, Milwaukee. Mr. Cavanagh formerly was president of the Cavanagh Automobile Co., of Chicago, and later was manager and buyer for the motor supply department of Montgomery Ward & Co. The Gross company is one of the largest wholesale and retail supply houses in the Middle West and was the first hardware company in Milwaukee to establish a motor supply department, which was the first of its kind in Milwaukee.

Garage and Dealers' Field

Eckberg Moves in Worcester—V. K. Eckberg, agent for the Franklin in Worcester, has moved from 22 Commercial street to a big building at 18 Wellington street, where in addition to his salesrooms and service department he has garage accommodations for fifty cars.

St. Louis Accessory Houses Merge—St. Louis' leading automobile supply houses were merged during the past week, the Phoenix Automobile Supply Co. purchasing the Continental Equipment Co., including its two stores. The name of the Phoenix will apply to the merged firm, whose officers are: O. L. Garrison, president; C. R. Garrison, vice-president; A. R. Baxter, secretary and treasurer, and John F. Shuford, general manager. The Phoenix was the first supply house in St. Louis, being started in 1906 as the Central Auto Exchange. A year later the Garrison brothers bought the stock and changed the name to the one it now carries. The company will maintain three stores